The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Unemployment Statistics

IN view of the recent attention drawn to the subject of unemployment among chemists we have been in communication with the Institute of Chemistry, which has for a long time past given sincere attention to this problem and preserved an appointments register and statistics relating to its unemployed members. By the courtesy of the Registrar, a true friend of the young chemist, we are able to publish some interesting figures which have been prepared for publication in the forthcoming issue of the Institute *Journal*. These, it will be seen from the table which follows, cover the period 1919 to 1923. They do not, of course, include the whole field of unemployment, but as representing the position among organised professional chemists they are certainly a helpful index to the general situation. Taking first the number of Fellows, Associates, and Students on the appointments register, the figure for February of this year, 394 (9·7 per cent. of the total membership) is the highest on record with the exception of August and November of 1922, when the corresponding figures were 435 (11·3 per cent.) and 465 (11·8). But as regards the number actually unemployed the figure of 174 for February of this year (24 Fellows and 150 Associates) is much the highest in the whole series. The table published below shows the situation at a glance :—

	Number on Institute's Register.	Number on Appointments Register. Total	Per cent.	Number Unemployed. Total	Per cent.
1919					
February ..	2,463	260	10·5		
May	2,496	240	9·6		
August ..	2,770	195	7·0		
November ..	2,915	195	6·7		
1920					
February ..	2,961	180	6·1	24	0·7
May	3,042	175	5·8	13	0·4
August ..	3,116	168	5·4	22	0·7
November ..	3,209	*166	5·0	17	0·5
1921					
February ..	3,270	*215	5·1	48	1·5
May	3,313	*245	7·4	50	1·5
August ..	3,465	*280	8·0		
November ..	3,517	*280	8·0	74	2·1
1922					
February ..	3,641	*325	8·9		
May	3,725	*360	9·6	70	1·9
August ..	3,835	*435	11·3		
November ..	3,940	*465	11·8	114	2·9
1923					
February ..	4,062	394	9·7	174	4·3

* These figures include Fellows, Associates and Students.

Some notes prepared by the Institute help to elucidate these statistics. Of the 174 unemployed 150 are Associates and 24 Fellows. The unemployed Associates include 77 recently elected members, mainly ex-Service men, seeking their first appointments. The 24 Fellows out of employment come generally within the following categories :—Chemists who have been recently released from military or quasi-military service and are seeking reinstatement in civil life, chemists who have returned from posts abroad, consulting chemists whose practice has been impaired by industrial conditions, and chemists who are temporarily prevented by restricting covenants from entering into employment wherein they can utilise their specialised experience. The remainder are victims of trade depression, and are men of mature age who have held responsible positions. The percentage of unemployed (4·3) for February is very much the highest figure in the series. Returns obtained by the Institute in June, 1920, showed that there were then in the recognised Universities and Colleges 4,808 students in various stages of preparation for degrees and diplomas in chemistry as compared with 2,078 in 1914—an increase of 130 per cent. These numbers included many students other than those definitely preparing for the profession of chemistry.

The Institute's view of these figures is that they are, on the whole, not unsatisfactory when account is taken of the state of industry throughout the world

and the rapid growth of the profession; but members are asked, particularly through the local sections, to take every opportunity of notifying the Registrar of any vacancy. It is common to assume that the war, with the exceptional call it made on chemists, resulted in an enormous inflation of employment, but the Institute figures show no evidence of any erratic movement. On the contrary, the increase in membership is remarkably uniform and consistent. The increase in unemployment is most marked since the year 1921. Before that period the highest percentage figure was 0·7. For February of 1921 it was 1·5, while for February of this year it is 4·3. In spite of all this we have the Registrar's conviction that a proportion of the unemployed are being steadily absorbed in industry, that supply and demand are gradually becoming better balanced, and that the position is not so far from the normal as might at first appear.

A Conference on Leaching

We have often had to compliment the Chemical Engineering Group of the Society of Chemical Industry on the excellent results of its periodical conferences, and the discussion on leaching which the Group organised last week at the Chemical Industry Club may be set down at once as one of the most educative and stimulating. This is a very good example of the Group's efforts to raise the general standard of efficiency. Cases were mentioned in the course of the discussion in which an over-all efficiency of about 30 per cent. was considered good enough, while the figure of 90 per cent. was confidently spoken of as quite possible. It is true, as Professor Hinchley pointed out, that an increase of efficiency may sometimes be purchased at too high a cost, but in the end it is generally found that the expense of getting rid of avoidable inefficiency is not prohibitive when the problem is seriously tackled by the competent engineer. In any case the way to progress lies in the frank recognition of inefficiency, in a thorough discontent with anything short of the best, and in a serious effort, through exchange of ideas and experiment, to reach the highest practicable standard. It is this spirit which makes the Group one of our most virile organisations and brings into its discussions such a fund of constructive suggestion and criticism.

Another good point about the conference may be noted. It is the first occasion, so far as we know, on which a reporter representing the technical press has been permitted on the club premises, and the result is that those who were unable to attend get some benefit from the proceedings. This is distinctly a step forward. We were among the first to suggest the Club as an open platform for addresses and discussions which fell outside the conventions of the more strictly organised societies. The early experiments quite justified themselves, but the good was largely neutralised by the childish dread of publicity which haunted those fearful souls so well described by an English hymn-writer. Gradually, however, they are emerging from the kindergarten stage, and opinions about leaching and similar processes openly expressed in discussion are no longer treated as sacred disclosures tremulously lisped into the ear of one's confessor. Such a conference as that of last week not only helps the work of the Group; it is equally good for the Club. And we cordially support the hope of our correspondent, whose excellent notes on the conference appear on another page, that many more may follow.

The Indefinite Role of Vitamins

In these columns a few months ago attention was drawn to the fact that in the sphere of food chemistry the importance of vitamins is in danger of being overemphasised. We pointed out at that time that physiologists had for years taught that if one partakes daily of a diet containing protein, carbohydrate and fat in certain proportions and minimal amounts, together with water and mineral salts, one has a perfect diet for maintenance and energy purposes. If this were really so, it would follow that when such a diet was prepared from chemically pure substances it would physiologically be complete and sufficient. It has been found, however, that this is not the case, although when a small quantity of milk is given in addition the diet proves satisfactory. Obviously, therefore, there are certain substances which are capable of supplying a necessary unknown factor, and these have appropriately been named vitamins. Even to the average chemist the study of vitamins proves a little entangled, mainly owing to the fact that it is not at the present time possible to state the exact composition of these bodies, whose name was originally given them by Funk. As is generally known, however, three classes of vitamins, having different actions, are now recognised, and they are distinguished as "fat soluble A," "water soluble B," and "water soluble C" factors. The fact that the present is an age of artificial foodstuffs, and that in so staple a product as margarine there is no evidence of the presence of any one of the three vitamins, has been responsible for the warning that we are making ourselves far more prone to so-called "deficiency" diseases.

On the other hand, it has been contended that the normal diet is so varied that the deficiency of vitamins in one foodstuff is counteracted by their presence in another, although some authorities warn us that such an assumption is likely to lead to a false sense of security. Again, more recent opinions incline towards the belief that the importance of vitamins is overstated, and it is suggested that, so far as can at present be judged, they are not nutrients in the usual sense, but necessary stimulants or activators of the digestive and assimilative functions. Considerable interest is, accordingly, attached to the recently issued Report (for the year 1922) of the Rowett Institute of Bucksburn. This institute exists primarily for the investigation of animal nutrition, and the inquiries which it conducts into the fundamental principles of the subject have some considerable bearing on the problems associated with the human being. A general survey of this Report leaves the impression that those responsible for it are not prepared to take for granted the importance of adequate vitamins, but that it is the deficiency of mineral constituents which needs primary attention. The opinion expressed, in fact, leaves one's views as to the true role of vitamins rather more confused than ever, and here at least we find a fascinating problem in biochemistry and physiology which awaits definite solution.

A General Trade Expansion

THE feeling that the volume of our overseas trade is generally and genuinely expanding receives striking confirmation in the Board of Trade Returns for January which are dealt with in detail on another page. Our total imports amounted to more than 99½ millions, an increase of 5 per cent. as compared with December last, which, however, contained three fewer working days. Exports showed a rise of 13½ per cent. at just under 67 millions, while re-exports rose by 15½ per cent. to 9¾ millions. Compared with January, 1922, imports were larger by over 30 per cent., while the total exports registered an advance equal to nearly 7 per cent.

An even better position is reflected in the portion of the returns dealing with chemicals, drugs, dyes and colours, the month's exports under this heading being nearly £622,000 greater than in December last and over a quarter of a million more than for January, 1922. This last comparison is particularly significant as, in view of the comparative steadiness of price movements during 1922, comparisons of value are not now so misleading. It is true that the December chemical exports were down £250,740 on the previous month, but even allowing for this the exports for the month under review show a net increase of £371,232, a figure which furnishes distinct cause for the optimistic feeling which is noticeable in the trade. While we are exporting more chemicals we are also importing more, the increases being £224,050 on December last and £459,111 on January, 1922.

In regard to imports the largest increases are to be noted under sodium compounds, particularly nitrate, potassium compounds, coal tar intermediates and barytes. The largest downward movement is associated with borax, of which only 2 cwt. were imported, as compared with 5,477 cwt. brought in during December.

The most noticeable improvement on the export side relates to coal tar products, the value of which was nearly four times that of the December exports; the quantity of tar oil and creosote exported was nearly 4¼ million gallons more. Sulphate of ammonia is going out of the country in ever-increasing quantities and the January figure, 23,836 tons, is the highest recorded for some time. While sulphuric and tartaric acids show a comfortable margin of increase the sulphuric acid total of 1,157 cwt. is in peculiar contrast with the 16,233 cwt. exported in January, 1921. Bleaching powder, glycerin, sodium sulphate and potassium compounds other than chromate and bichromate were the only chemicals the exports of which were smaller than in the previous month.

Colloidal Clay Experiments

WHEN the late Mr. F. E. Weston announced in THE CHEMICAL AGE the result of his exhaustive researches concerning colloidal clay, it was clear that ultimately important commercial results would follow, though not for some time. Research has been steadily carried on since by other workers, and in our monthly China Clay Supplement in this issue some account is given of results which have been obtained by the English China Clays, Ltd., of St. Austell. For the moment one need not discuss the point whether the clays obtained by this company's processes are colloidal in the strict chemical sense. What really matters is the production of grades of clay of a highly refined quality, which may be applied to new uses and in that way extend the British clay industry. To Cornwall users of China clay still look for the best qualities, and any processes which tend further to improve the standard of purity must proportionately benefit the British industry. America already is a very large purchaser of British clay, and the wide circulation of THE CHEMICAL AGE across the water should prove of considerable value in extending the knowledge of the best British products. Next month we hope to publish in *The China Clay Trade Review* the first of a series of articles on colloidal clay by Mr. A. B. Searle, a well-known authority on the subject, which promises to be widely appreciated by all interested in the industry.

Points from Our News Pages

Some experiments with a growth impregnated charcoal catalyst are described by Mr. A. Pickles, M.Sc. (p. 166).

The progress made in the manufacture of British fine chemicals is described by a representative of THE CHEMICAL AGE (p. 167).

Notes are given by a correspondent on the Chemical Engineering Group's Conference on leaching and evaporation (p. 168).

Further work on the photo-synthesis of plant products was described at a meeting of the Royal Institution (p. 172).

A distinct improvement in chemical exports is recorded in the Board of Trade Returns for January (p. 174).

According to our London Market Report most chemicals are in good demand and price movements are upward, almost without exception (p. 184).

According to our Scottish Market Report, a fair number of inquiries has been received. Continental quotations are inclined to be lower (p. 187).

The Calendar

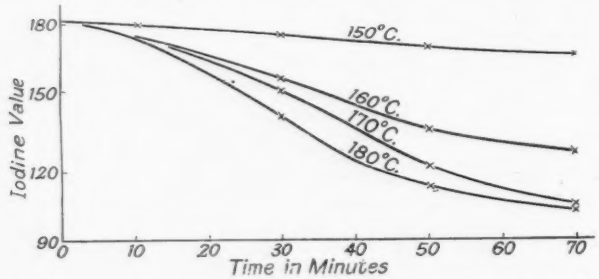
Feb. 19 to Mar 2	British Industries Fair. Daily, 10 a.m.–6 p.m.	London and Birmingham.
19	The Royal Society of Arts: "The Vulcanisation of Rubber." Lecture III. H. P. Stevens. 8 p.m.	John St., Adelphi, W.
19	The University of Birmingham Chemical Society: "The Poisoning of Catalysts." Dr. E. B. Maxted.	Birmingham.
19	The Institution of Rubber Industry (Manchester Section): "A Review of all Solvent Recovery Processes." J. H. Wild.	Manchester.
20	Society of Chemical Industry (Birmingham Section): "The Measurement of the Concentration of Hydrogen Ion."	University Buildings, Edmund Street, Birmingham.
21	Society of Glass Technology. Meeting, 2.45 p.m.	Armstrong College, Newcastle-on-Tyne.
22	The Chemical Society: "Some Constitutional Problems of Carbo-Hydrate Chemistry." Principal J. C. Irvine. 8 p.m.	Institution of Mechanical Engineers. Storey's Gate, S.W.1.
22	The Royal Society: Bakerian Lecture: "The Distortion of an Aluminium Crystal during a Tensile Test." G. I. Taylor and C. F. Elam. 4.30 p.m.	Burlington House, Piccadilly, W.1.
23	The West Cumberland Association of Chemists, Chemical and Metallurgical Engineers: "The Origin and Distribution of the Salinity in Rain and River Water." W. Irwin.	Workington.

Experiments with a Growth-Impregnated Charcoal Catalyst

By Alwyn Pickles, M.Sc.

The writer makes an interesting suggestion which really amounts to a reversal of the usual operations involved in the impregnation of charcoal. From small-scale experiments it would seem that so far as charcoal is concerned there is something to be said for impregnation prior to carbonisation.

THE systematic study and application of hydrogenation processes is of comparatively recent date, though isolated observations, many of them of great significance, have been recorded during the last hundred years. The development of the margarine industry during the war, and the growing demands of the soap and candle maker have created a demand for solid and semi-solid fats which can only be satisfied by the cheap transformation of the commoner liquid fats, generally glycerides of unsaturated acids, into the glycerides of the corresponding saturated acid. This transformation has been brought about by the addition to the unsaturated molecule of hydrogen through the medium of catalysts. Nickel is the catalyst most in favour, the nickel being precipitated in the oil to be hydrogenated usually from nickel carbonyl. The



temperature at which hydrogenation proceeds is sufficient to decompose the carbonyl, this producing in the system the finely divided catalyst. The nickel may also, presumably, be attached to some suitable support, and, considering the porous nature of charcoal, it is not surprising to find that specially impregnated charcoals have been so used. It must be admitted, however, that such a support is not in favour, but the following results tend to show that if a charcoal is impregnated in a proper manner, such a support may be used with quite good results. The results given are for small-scale experiments, a fact which must be kept in mind in assessing the value of the method.

A study of the effect of certain metallic salt solutions on the growth of certain herbaceous plants proved that under certain conditions it is possible to introduce into a plant tissue small amounts of a metallic salt. Such salts are no doubt taken in by the plant in other than the usual way—that is, the normal root function is impaired and so allows the passage of a foreign salt. A plant growing in the usual way will take up a very small amount of the nickel, but if twigs of a woody plant, such as willow, are placed in, say, nickel nitrate, the amount of nickel salt taken up is considerable. The amount of salt taken up may be still further increased by adding to the nickel nitrate some ammonium nitrate. Such impregnated twigs are then carbonised and the charcoal so obtained steam treated and then acid treated, using very dilute HCl. In the case of willow, the resulting charcoal is very soft and easily obtained in an extremely fine powder. If ammonium nitrate has been added to the solution for the impregnation, the charcoal appears to powder still more readily. This is possibly due to the decomposition of the nitrate in the wood fibre during the carbonisation. In the experiments, whose results are given, the twigs of willow were grown in nickel nitrate—ammonium nitrate solution containing 50 grams of each salt per litre. The temperature was also kept at about 20 C., for it was found that impregnation proceeded more rapidly, which is an important fact, since the twigs soon lose their vitality in such solutions. Before carbonisation, the portions of the twigs that were immersed in the impregnating solution were removed so that all nickel ultimately present in the charcoal was present due to absorption by the plant.

Carbonisation of the twigs would decompose the nickel nitrate so that the charcoal would contain nickel oxide, together with a little reduced nickel. To complete the reduction, the charcoal, after powdering, was reduced at a red heat, using ammonia gas, since it was found that this gas was more easily purified than hydrogen. This reduction process also still further reduced the state of division of the charcoal and made it suitable for introduction into such a medium as an oil. Birch wood may be similarly impregnated, though the resulting charcoal is not so readily obtained in a fine state of division. Ash is not so suitable, while cocoa-nut shell, as might be expected, is useless. The oil chosen for the experiments was linseed oil, commercial. It was used in quantities of 200 ccms. at a time and at temperatures 150 C., 160 C., 170 C., and 180 C. The charcoal powder, which contained about 30 per cent. of nickel, was added at the rate of one gram per 100 ccms. of oil. Pressure was 1 atmosphere. The hydrogen used was generated by the action of zinc and dilute sulphuric acid, purified by passing over pumice and strong sulphuric acid and then through permanganate of potash solution to remove possible sulphur compounds. A slow stream of hydrogen was bubbled through the mixture of oil and charcoal contained in a wide-necked bottle. The respective temperatures were obtained by having the bottle immersed in a large beaker of linseed oil, whose temperature was so regulated that the temperature of the oil in the bottle was the one required. In the case of the temperature 180 C, the oil was placed in small beaker and direct heat used, using a small Bunsen flame.

The progress of the hydrogenation was followed by determination of the iodine value of the oil at intervals, the oil being filtered while hot to remove the charcoal particles. Wijs method was used for the iodine value. The results obtained are given below and also expressed graphically.

TEMPERATURE, 180° C.					
Time	0	10 mins.	30 mins.	50 mins.	70 mins.
Iodine value ..	183	175	143	114	104
TEMPERATURE, 170° C.					
Time	0	10 mins.	30 mins.	50 mins.	70 mins.
Iodine value ..	183	174	156	123	107
TEMPERATURE, 160° C.					
Time	0	10 mins.	30 mins.	50 mins.	70 mins.
Iodine value ..	183	171	159	136	128
TEMPERATURE, 150° C.					
Time	0	10 mins.	30 mins.	50 mins.	70 mins.
Iodine value ..	183	180	177	169	166

Exact estimation of nickel in a growth-impregnated charcoal is difficult owing to the almost complete incorporation of the nickel and the charcoal. Hence any really reliable comparative results, using a charcoal impregnated by soaking and subsequent ignition, are not easy to obtain. Such a comparison was attempted, using a charcoal impregnated with nickel by soaking in nickel nitrate and subsequent ignition and mixing such charcoal with untreated charcoal until the percentage nickel was the same as in the sample used but impregnated by growth. In each case, the growth-impregnated charcoal was the more efficient. The following results are given, but with some reserve :—

At 180° C, iodine value of the oil after 70 minutes' action was 121; at 170° C, iodine value of the oil after 70 minutes' action was 148; at 160° C, iodine value of the oil after 70 minutes' action was 169; at 150° C, iodine value of the oil was so little changed as to suggest that hydrogenation does not take place at 150° C.

The efficiency of the charcoal appeared to be well maintained, and removal of the charcoal from the oil after the hydrogenation, presented no difficulty if the filtration was carried out while hot. If allowed to cool, the oil becomes much more viscous.

An interesting result was obtained by passing the vapour of nitro-benzene, mixed with hydrogen, over some of the growth-impregnated charcoal contained in an iron tube heated to about 500° C. Ammonia was readily detected, as was also aniline, but the smell of phenol was also unmistakable. The catalyst material in this case soon lost its activity, and it was also difficult to regulate conditions so that only one product was obtained. Nevertheless, the result is not without interes .

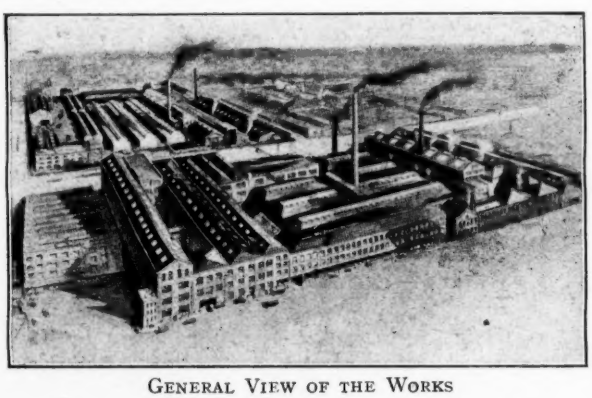
Progress in British Fine Chemicals

Impressions of a London Firm's Works

One of the principal objects of the Chemistry Section of the British Industries Fair is to demonstrate the progress made in the home production of chemicals, dyestuffs, etc., for the supply of which we had formerly to depend on foreign sources. Among these products, fine chemicals occupy a place of the first importance, and, in view of the contemplated inquiry into the operation of the Safeguarding of Industries Act, it may be interesting to give a glimpse of the work being done in this field by a typical British firm, or combination of firms, The British Drug Houses, Ltd., whose extensive works occupy both sides of the Regent's Canal at Islington, and cover altogether about seven acres.

Success in New Fields

The first impression in going through the various departments is one of orderliness, scrupulous cleanliness, and general activity. The firm has felt the effect of the "slump," as every other firm has, but, in spite of trade depression, it has confidently pushed on with its work; and while it is common to hear of reductions and restrictions elsewhere, here one found the existing departments busy, and even more significant still, new extensions in course of construction.



General View of the Works

Already the firm's output amounts to about 3,000 substances, and when one realises that while a few are sold in tons, a large proportion—important as they are—are required in quite small quantities, it is easy to understand the managing director's plea that the fine chemical industry to be worthy the name must be organised as a whole and cannot be composed out of odd pieces and products linked up with hooks and eyes to look like a complete industry. The costly plant, the highly skilled staff, the supervisory organisation, and all the rest necessary to the production of rare chemicals can only be justified by an output covering practically the whole range of fine chemicals. On such a comprehensive basis, a loss on one small but highly essential product may be balanced by a gain on large quantities of another, and only thus can a complicated and costly scientific, manufacturing, and distributing organisation be commercially justified. The more complete the range of products the more efficient is the organisation likely to be, since the resources for research and experiment, for manufacture, for mechanical handling, and for distribution are proportionately larger.

It was gratifying to hear from Mr. Hill, the managing director, of many new developments, as the result of which the firm is now producing hundreds of chemicals which formerly could be obtained only in Germany. Laboratory chemicals, including analytical reagents of guaranteed purity and chemicals for research, form only one branch of the fine chemical industry which has been developed by this firm. Alkaloids, glucosides, and other active principles are extracted from crude drugs and manufactured into fine chemical products. These, as well as many synthetic organic substances used as therapeutic agents, and other fine chemicals such as pure glucose, are manufactured on an industrial scale which permits of supplying not only the firm's private clients but the trade generally. Another department, distinct from the foregoing, is that devoted to the production of microscopic stains and dyes. Allied to this class of manufacture is the production of the newer indicators employed in the determination of P_H value, in which the firm has done pioneer work.

The Supreme Factor of Quality

Production in itself, however, is not enough; it must be production of the right quality, and here the company hold a very confident position. There was a time when firms suddenly called upon to produce new substances had difficulty in finding just the right class of men for these extremely delicate operations. But that difficulty has not proved insurmountable, and to-day the company can complacently regard competition *in quality* with the best of foreign products

In going through the works, Mr. Carr was asked as to the relative quality of German and British fine chemicals to-day. No doubt, he admitted, Germany had done some excellent work, but her reputation for miraculous quality was largely the result of skilful advertising, which had produced an impression or reputation that, once established, ran on for some time. "To-day," he confidently stated, "the quality of many of the foreign chemicals is below that of our own products." In illustration, he mentioned many instances in which he had found the British product to be purer than the German.

Some of the large scale plant is very impressive, and turns out pure products at the rate of several tons per week. Much of the plant again is designed for moderate scale production; this is "standardised" so that parts are interchangeable and readily replaced. Plant of this character is capable of producing a number of different synthetic organic substances.

All British Glassware

In going through yet other buildings one noticed numbers of operations in which only glass tubes and vessels were being used. The explanation was that so high a degree of purity is necessary and so sensitive are many of the substances that even the best enamel-jacketed ware is unequal to the demand, and glass solely has to be employed. "British glass?" we asked. "All British," was the reply, "and we find the quality for all these delicate operations quite satisfactory." "And the price?" "A little dearer, perhaps, but we do not complain. The increase in price over pre-war figures is considerably less than the increase in labour and other costs, and we see no ground to complain of it as unreasonable, as so many of our professor friends love to do."

Questions and inquiries that occurred in our progress through the works all went to strengthen the conviction that fine chemicals can be produced in this country at least as well as in any other—in fact, are being produced—and that reasonable support for those who are engaged in this national enterprise is all that is needed ultimately to ensure success.

Glucose and Insulin

Two excellent examples may be given in conclusion of what has been and still promises to be accomplished.

The first instance is the manufacture of pure crystalline Glucose or Dextrose, a substance which is used in medicine and commonly administered by injecting a solution into the patient's veins. It was obvious that for such a use the very high standard of purity which the firm has set up is by no means quixotic, and we were impressed by the sight of about half a ton of this material which was in course of final purification by the special method of crystallisation employed.

Equally, if not more, interesting is the extension of premises now proceeding for the purpose of manufacturing Insulin, the new remedy for diabetes. The British Drug Houses, Ltd., has been granted a licencefor the manufacture of Insulin, and a new building is rapidly going up in which production on a commercial scale will be carried on. Meanwhile experimental production on an intermediate scale is proceeding satisfactorily. Insulin of the required quality is already being produced in small quantities and is now undergoing physiological trial, so that by the time the commercial plant is installed the manufacture of this latest addition to the firm's long list of productions will proceed without a break.

C

Conference on Leaching and Evaporating

Another Success for the Chemical Engineering Group

A conference on the subject of Leaching and Evaporating, organised by the Chemical Engineering Group, was held at the Chemical Industry Club on Friday, February 9, with Mr. J. Arthur Reavell in the chair. The discussion, which was opened by Professor Donnan, proved of an interesting and useful character.

Some General Impressions

(From our own Correspondent.)

Whoever was responsible for conceiving the idea of holding three or four meetings of an informal character each winter session, under the auspices of the Chemical Engineering Group, at the Chemical Industry Club, must have been gratified with the result of the meeting on Friday week. It is obvious that there is much ground which will have to be covered ere the Chemical Engineering Group's Committee, whose activities are largely educational, can claim to have fulfilled its mission. That this Group, or section, has abundantly justified its existence no one doubts. Only a few of the sectional subjects coming within the domain of chemical engineering have been dealt with, and as many of these have ramifications of a wide and diverse kind, it is clear that the attempt to traverse the ground at a little quicker pace than has hitherto been possible is a distinctly commendable step, gratuitous recognition of which should be forthcoming from those concerned.

"Leaching" and "Lixiviation"

Leaching is one of those sectional subjects of chemical engineering concerning which very little information exists. What precisely is meant by leaching, in contrast with lixiviation and percolation, were questions raised by one etymological-chemical engineer, who was apparently more concerned about etymology than leaching. It was generally agreed, in the absence of reference to some suitable technical encyclopædia, that "leaching" was a mining engineer's term, used to denote the washing out or extraction of some soluble or other constituent from a metalliferous substance, and that "lixiviation" was the term applied to the extraction of soluble matter from cinders or ashes (*lix*: Latin, ashes), whereas percolation has reference to the purification or separation from extraneous matter by filtration. It is not to be imagined that chemical engineers will trouble inordinately as to which term is used, or whether such term is employed with the precision with which Archbishop Trench was wont to use words. Happily, the term leaching is well understood by the chemical engineer, and as it savours of Anglo-Saxon, if it is not actually Anglo-Saxon, presumably it "fills the bill."

Professor Donnan's Work

Professor Donnan, as is generally known, had occasion in December, 1918, and July, 1919, to make an extensive investigation of the efficiency of the methods of treatment in operation at a number of nitrate oficinas in Chile. This investigation culminated in the publication of a detailed report issued by the Chilean Nitrate Committee. Those who were aware of the existence and had some knowledge of the contents of the report in question were naturally keenly interested in the prospect of hearing Professor Donnan lecture on "Some control formulæ in connection with leaching and evaporating." The lecture, supplemented as it was by information of a practical character, illustrated with slides by Mr. J. A. Reavell, Chairman of the Chemical Engineering Group's Committee, was a distinct success, and the prospect of a further conference on this subject was foreshadowed by Professor Hinchley.

Those who were present will await with interest the publication of Professor Donnan's control formulæ, which went to the heart of the subject, and which are applicable to many leaching processes. Those who have been accustomed to systematic control of leaching operations will compare with avidity the formulæ supplied by Professor Donnan with other such formulæ, which have been devised to determine efficiencies in this connection. Professor Donnan invariably deals with fundamentals, as he did on this occasion, and one would have been delighted to hear more from him on the practical aspect of leaching problems, a subject on which he is undoubtedly well qualified to speak.

Leaching Processes

Leaching processes may be divided into four categories, namely:—

(*a*) Those which deal with natural material, such as caliche, or natural woods, from which respectively nitrate of soda and tannin extracts are secured, where the residue is generally discarded, and where the essential product is secured by crystallisation from or by evaporation of the leached liquor.

(*b*) Those which deal with a product which arises from a previous chemical operation, where the residue or gangue is commercially valuable, where one or more important products have to be extracted not only by leaching with water but with mineral acid, and where the recovery of the extracted products is not effected by crystallisation, but by other methods. A typical example is the treatment of cupreous pyrites cinders for the recovery of purple ore and copper, and occasionally, in addition, zinc, silver and gold.

(*c*) Those which deal with a product which arises from a previous chemical operation where the residue is discarded, but where the essential product is recovered by crystallisation or refrigeration, acidification, and concentration. Typical examples are, respectively, sodium sulphide and sodium bichromate.

(*d*) Those which deal with a by-product of a chemical process where the extraction of the essential product is effected virtually by leaching with the hydrate of an alkaline earth (such product being recovered by chemical treatment), and where the residue is more or less commercially valuable. A typical example is the manufacture of prussiates of sodium or potassium from spent oxide by the method usually in vogue.

In the discussion which followed Professor Donnan's lecture, several of these processes were briefly touched upon, but it must be obvious that there is ample subject matter for a further conference, especially when such practical considerations as those outlined below await an authoritative answer.

Category *(a)*

(1) To what extent can the operation of leaching be assisted by grinding?

(2) Is there a specific degree of fineness, compatible with maximum efficiency of leaching? If so, what is this degree of fineness?

(3) Having regard to solubility curves, is it desirable to resort to maintenance of a high temperature in the Shank's tanks, and to what extent does a too high concentration militate against efficient leaching?

(4) Do the Shank's tanks give perfect displacement, or could better results be secured by positive upward or downward percolation, secured by pumping, or otherwise?

(5) To what extent would the efficiency of leaching be aided by the formation of a graded medium on which the product to be leached rests?

(6) Do the Shank's tanks allow of the gangue being adequately drained?

(7) Can the thermo-syphon principle be applied to leaching with advantage?

(8) Is the securance of a concentrated solution always compatible with efficient extraction of the soluble matter from the material to be treated.

Category *(b)*

In this case grinding, and the subsequent operations of admixture with salt, and chlorinating roasting affect considerably the question of leaching efficiency. It is known that grinding can be so fine as to produce a material giving impervious properties. Pumping from vat to vat is usually resorted to. It has been found that by the adoption of mechanical chlorinating furnaces, over a 50 per cent. increased time contact is necessary as compared with the material resulting from the hand operated chlorinating furnaces.

Liquors of too high concentration must not be circulated, otherwise trouble may arise from barium and/or calcium salts crystallising out, thus filling up the interstices of the material and rendering subsequent washing well-nigh impossible.

Some of the questions and considerations cited under Categories (*a*) and (*b*) apply also to Categories (*c*) and (*d*), whilst, of course, there are other problems peculiar to the latter.

The necessity for further consideration of the sectional subject " leaching " does not require to be urged. One final comment only needs to be made, and that is that Chile is not the only country where there is a failure to appreciate quantitative data and the significance of correct weighing and sampling. It is hoped, however, that it will be impossible much longer to level this reproach at the chemical manufacturers of this country.

Summary of Discussion

Professor DONNAN opened by giving a series of elementary formulæ which he had prepared as the result of a visit he made to Chile during the war, when he investigated the working of six or seven nitrate factories. He explained that the formulæ were entirely elementary, and were such as would not be required in regard to the working of factories in Europe; he referred to them as elementary mill formulæ, designed with the object of improving the efficiency of the factories in question, which was very low, namely, between 50 and 60 per cent., instead of the 80 per cent. or more which ought to have been attained. He gave some interesting details of the more or less casual manner in which the nitrate factories in Chile were then run, and said that it was perfectly easy to get a regular leaching efficiency of 90 to 95 per cent. under proper working conditions.

The CHAIRMAN showed a number of lantern slides of modern leaching plants of the open and closed types for extracting tan from barks or wood, and pointed out the advantages of using distilled water in the apparatus. He drew special attention to slides of a plant which was designed by Sir John Thornycroft during the war for dealing with sugar. Sir John Thornycroft, he said, had never done any leaching before, but he approached the problem as a scientist and produced one of the most magnificent systems of leaching that had ever been designed, and which had been described, by people who knew, as the last word in leaching. This apparatus, he said, gave a perfect counter-current effect, and was of the greatest possible use during the war at a time when the leaching systems for sugar were not as satisfactory as they could have been. Another form of leaching apparatus illustrated was one recently put to work in India, and was a gas agitation tanning extraction process. He explained that there was a curious difference between Indian barks and other barks, in regard to the nature of the fibre, which had a tendency to block up the mesh of the perforated copper bottom of the apparatus, and that this was overcome by using gas instead of air for circulating. This gas was taken from the engines driving the mill, the gas engines using charcoal as fuel. Another interesting thing which had been found in regard to Kauwa bark, which was used in this particular case, was that it contained 35 per cent. of tan and also 40 per cent. of pure calcium oxalate. Thus the oxalate was a by-product of the tan factory; and perhaps it might eventually be found that the tan factory would be a by-product of the calcium oxalate. This fact was discovered in the handling of the residue of the bark, the object of which was to make it into charcoal and use it on a Thornycroft lorry, which had been fitted with a producer gas plant for driving it, because petrol in India cost 5s. 6d. per gallon. It was found that it was difficult to get any proper heating or burning of the charcoal ovoids so made, and after examination in the laboratory it was discovered, to the amazement of everyone concerned, that the Kauwa bark contained this large percentage of calcium oxalate.

Dr. GORDON PARKER asked Mr. Reavell what objection he had to the press leaching system as compared with the one he had shown, consisting of batteries for bark or tanning materials. Personally, he believed strongly in the press leaching system, because it saved steam. As to the Thornycroft plant, he looked forward to a demonstration of this upon tanning materials, which had been promised in a few weeks' time. One point about it which occurred to him was that it would go a long way towards saving the cost of those wonderful doors which always leaked in the ordinary apparatus. They did not leak in the apparatus when it left the makers, but when they were placed in the hands of the ordinary British or Chinese or Indian workman not much care was taken with them, and if any material got around the edges of the door the workmen just jammed the door in order to close it and did not trouble to remove the material. The result was that in a few weeks doors soon leaked. Apart from this, the Thornycroft system was of immense interest, and he sincerely hoped it would help in solving some of the problems which both tanners and extract manufacturers had.

Mr. P. PARRISH said the question of leaching had got to be looked at from at least three points of view. He had had a good deal of experience in connection with the calcining of cupreous pyrites, which was a totally different proposition from the one which Professor Donnan had dealt with. Professor Donnan's proposition was essentially the same as that which arose in connection with the preparation of sodium sulphide, but even in that case there was a preliminary operation and all sorts of factors operating which either assisted or retarded the efficiency of the leaching. In much the same way the efficiency of the extraction of copper was either assisted or retarded by the efficiency of calcination. Then there was a third case, such as that which arose in connection with the extraction of ferrocyanides or spent oxide. He had had occasion two years ago to visit a country somewhat allied to Chile, and was only given a week in which to find out the difficulties with which the works were beset. He had had a similar difficulty to that experienced by Professor Donnan, in that those responsible for the works had no appreciation of the importance of the weight either in or out and they had certainly no efficiency figures. The result was that it had been necessary to make a determination, first of all, as to the over-all efficiency of the extraction by leaching, which he found did not exceed 30 per cent. Then he had to determine in a very short time where this inefficiency was arising, and he found that it was not so much due to the process of leaching as to the fact that they were using an inordinate quantity of lime in relation to the Prussian blue content of the spent oxide, and polysulphides were being formed which converted the ferrocyanides into sulphocyanides, and the loss occurred at that point. The leaching was by no means efficient, but the leaching did not altogether account for the over-all efficiency of 30 per cent. to which he had referred. In order to obtain satisfactory leaching with pyrites, he had come to the definite conclusion that a special screening test must be applied to every variety of cupreous pyrites, and that the physical condition must be correlated to the physical characteristics of the material. The same thing applied to spent oxides used at gasworks. Spent oxide, which was of a granular character after purification by hydrogen sulphide and hydrocyanic acid, was reasonably porous, and admitted of decent leaching, but if they took bog ores from Holland or Belgium, or even the German Lux, which contained alumina and also iron in a peculiar colloidal form, it was a very difficult matter indeed to leach that material and to get it absolutely free from Prussian blue. He did not think there was any great difficulty in working to the 90 per cent. efficiency which Professor Donnan had indicated, but there was a tendency in a number of works throughout the country either to discard the mother liquor or to leave the material in a wet condition before it was discharged from the lixiviators, and a great deal of loss arose there. After the first wash there was a highly concentrated solution of, say, sodium sulphide or any other soluble salt that was being leached out, and that was occluded in the interstices or pores of the mass to be subsequently leached. He had found that all sorts of trouble arose by reason of the fact that they did not strain sufficiently or did not pump sufficiently well the mass which was to be leached.

Dr. W. R. ORMANDY referred to the connection between leaching and the extraction of soluble material from vegetable matter by cataphoresis, which had been worked out by Count Schwerin in Germany, and had been put to work on a large scale for the production of sugar from sugar beet. It had been found that a much purer sugar solution could be obtained in a concentrated form in that manner, but it turned out that the actual cost of the apparatus and electric current was too great to render it possible as a commercial operation, whereas the cost of ordinary leaching was comparatively small, after allowing for the first cost of the plant.

Mr. ALEXANDER REID remarked that the Thornycroft leaching apparatus seemed to be an expensive plant, especially where a large volume of material had to be dealt with.

Professor J. W. HINCHLEY thought that the formulæ given by Professor Donnan were by no means so unnecessary for some works in this country as might be imagined. Only the other day he had come across trouble in a works due to the fact that batches of 13½ lb. were supposed to be weighed, but the men weighed up 13 lb. and gave the scale a bump rather than trouble to weigh up the odd ½ lb. This suggested that the efficiency in works in this country could be considerably improved by more careful methods of control. He regarded the Thornycroft plant as an extremely clever one, but it did not follow that the form shown on the screen was that in which it would be applied for every class of material. On the question of an efficiency of 90 to 95 per cent., such a high figure of efficiency might be purchased at too great a cost, and the real point to be borne in mind was ways and means of increasing cost. After all, the real efficiency was money-making.

The CHAIRMAN, in the course of a brief reply, said that the reason why pumping was adopted in his firm's plant was that it enabled the exact temperature at any time to be obtained ; with the press leaching system that was not possible. The cost of the Thornycroft apparatus could, obviously, be considerably reduced by building it of wood.

Professor DONNAN also briefly replied.

Reviews

DICTIONARY OF APPLIED CHEMISTRY. By SIR EDWARD THORPE, C.B., F.R.S., assisted by numerous experts. Vol. IV. Pp. viii, 740. London: Longmans, Green and Co. 60s. net.

In a review of the second and third volumes of Sir Edward Thorpe's Dictionary, which appeared in THE CHEMICAL AGE for May 20 of last year, attention was drawn to the discernment with which the expert contributors had been selected and the prodigious amount of labour which a complete reference work of this nature involves. It would seem that there is scarcely a chemist or scientist of repute who has not added his quota towards the extensive re-casting which is apparent in the new edition. Innumerable additions have been made to subjects of technical importance, and many entirely new articles have been included. Among some forty specialists who have contributed to volume IV, one notices in particular the names of Professors A. G. and W. H. Perkin, Gilbert Morgan, Jocelyn Thorpe, and Drs. E. F. Armstrong, Julius Huebner, F. M. Rowe, and Walter Rosenhain. Dr. John A. Smythe, of Leeds University, contributes a remarkably concise article on lead which, occupying some 50 pages, may almost be regarded as a miniature text book on the subject. All the more general phases of lead technology, such as occurrence, various forms of smelting and roasting plant, desilverisation, etc., are discussed in detail ; and one's attention is attracted by the full consideration which the writer has given to the highly important and troublesome operation of dust and fume collection. As is well known, in consequence of the volatility of lead at high temperature a certain proportion of the metal and some of its compounds are carried away by the heated gases in the operations of refining, smelting, etc. To prevent loss and minimise the nuisance which would arise from permitting the gases to pass direct to a chimney, the furnaces are connected direct to various forms of condensing or precipitating chambers. What this operation involves may be gathered from the fact that in some establishments the collecting flues are no less than three to five miles in aggregate length, and acknowledgment for the highly compact arrangement which is available to-day is rightly given to F. G. Cottrell, whose work in connection with the application of electrical discharge to precipitation has frequently been referred to in THE CHEMICAL AGE. Fractional precipitation of fume consisting of materials differing in volatility may be effected with the Cottrell process when operations are conducted at different temperatures. Thus high grade white arsenic may be separated from lead fume by the electrical precipitation of lead and zinc compounds at a temperature at which white arsenic is gaseous. On cooling the escaping gases the oxide of arsenic becomes solid and can be recovered by repeating the electrical treatment.

A glance at what Professor W. P. Wynne has to say about naphthalene should be sufficient to emphasise the enormously important and varied rôle which this hydrocarbon plays in modern industrial chemistry. Professor Wynne's article occupies one-seventh of the whole volume, and his treatment is more exhaustive than any other in the English language which the writer has come across. Naphthalene has now been known for just about a hundred years, but until the discovery of the eosins and azo-dyes some fifty years ago it was regarded as a waste product, being employed as a fuel or burned for soot. Even now production is in excess of demand, although a considerable proportion of the output is utilised in the manufacture of phthalic acid, naphthylamines, naphthols, and other important intermediates of the dyestuffs industry. Most interesting of all is the work which has recently been conducted in an attempt to convert naphthalene into liquid hydrocarbons, mainly by hydrogenation under pressure ; and, as already described in articles in THE CHEMICAL AGE, its conversion into tetrahydronaphthalene (tetralin) has opened a new field for its employment.

Reading a dictionary for pure enjoyment is not an occupation to be recommended, but Sir Edward Thorpe provides us with an exception. We must regard his work essentially as an indispensable help-meet when we are in doubt as to some uncustomary technical problem up against which we may suddenly be thrown ; but, on the other hand, one can turn to it in such periods of relaxation as the lunch hour and find any amount of light and appropriate reading. For instance, how many of us knew that Angostura, the well-known "bitters," was orignally made by the Capuchin Friars Mission on the river Caroni in South America, and that its name is derived from an ancient city in Venezuela, now Bolivar ? Again, there are few who could supply off-hand the chemical formula for meerschaum, and explain technically why it is held in such high esteem by the pipe-smoker. The inclusion of information on these more unconventional topics does not necessarily make the Dictionary any more valuable to the average industrial chemist, but it certainly does emphasise its completeness and the encyclopædic character of its contents. The price of the complete work is high, but by no means excessive, and this is clearly a case where individual firms should shoulder the burden for the benefit of their technical departments and, incidentally, their own interests as well.

C. A.

QUANTITATIVE CHEMICAL ANALYSIS. By A. C. CUMMING and S. A. KAY. London: Gurney and Jackson. 1922. Fourth Edition. Pp. xv.+432. 15s. net.

Of the numerous text books on analytical chemistry published for the use of university and college students, some meet with but little demand. Others, more successful, find a wider field of use than the laboratory from which they emanate. The volume under review, first published in 1913, has now reached its fourth edition, and the authors have taken the opportunity to re-write portions of the text and to introduce new matter.

The contents include chapters on General Principles, Volumetric Analysis, Gravimetric Analysis, Colorimetric Methods, Systematic Quantitative Analysis, the Analysis of Simple Ores and Alloys, Gas Analysis, Water Analysis, Quantitative Analysis of Organic Compounds, the Determination of Molecular Weights, and an appendix containing, *inter alia*, a number of useful density and vapour pressure tables.

The new matter includes the determination of phosphorus, after precipitation as phospho-molybdate, by the alkalimetric method of Pemberton ; the Schneider bismuthate method for manganese, as modified by Reddrop and Ramage ; and Glasstone's modification of the Diehl-Topf iodometric method for the determination of lead oxide. The perchlorate method for potassium and Robertson's method for the determination of chlorine and bromine in organic substances (*J. Chem. Soc.*, 107, 902, 1915) are given.

The text shows that the authors have profited by the experience gained through the previous editions, and the book is remarkably free from typographical and other errors.

In more than one case attention is drawn to important points of detail in method which are frequently overlooked in books of this type. One or two matters call for attention. On page 17 it is perhaps unwise to encourage students in

accepting purchased reagents at their label value. On page 49 it is stated that standard sodium carbonate solution cannot be used instead of a standard sodium hydroxide solution for the determination of acetic acid, but the reason for this does not appear to be made quite clear in the ensuing paragraphs on the theory and use of indicators. Under the section on volumetric work, it might be worth while drawing the attention of the student to the occasional advantage in commercial work of operating not with normal solutions but with solutions which give the result of the analysis directly in the required units with the continuous use of logarithmic tables or a slide rule. One instance illustrating this point is given under the determination of chloride in waters.

The text book, as a whole, may certainly be classified as a very good specimen of its class. P.

COURS DE CHIMIE ORGANIQUE By F. SWARTS. Troisième édition revue et augmentée. Brussels: Lemertin. 1921.

In reviewing the third edition of a text-book of science one is naturally disposed to look favourably on that which clearly fulfils in the minds of many its proper function of imparting instruction in a simple and logical way to the uninitiated. If this substantial volume of 650 large octavo pages were written for students of organic chemistry who were intending to teach the subject or to specialise later in some branch of it, nothing either in the manner or matter of the information would afford room for criticism, but rather for commendation, but "the course," so the author states in the preface, "being moreover prepared for pupils, the majority of whom will not devote themselves to a very deep study of chemistry, I have tried to collect those facts which may later appeal to their interest." As these 650 pages of recondite facts and theories are to be assimilated by elementary students of the subject, one can only admire, and perhaps envy, the high standard of attainment required.

We will assume, however, that the above statement is mere modesty on the part of the author and that the student approaches the subject charged with a certain amount of previous information. In that case he will be able to understand the somewhat detailed discussion of simple and multiple linkage of carbon compounds — polymerism, tautomerism and stereoisomerism, and the question of tervalent carbon with which the first chapter opens. There is no reference to the purification of organic compounds, but qualitative and quantitative analysis is described and is followed by the usual methods for determining molecular weights, the Ramsay-Shields method for determining the association of liquids, distribution coefficients, thermochemistry of carbon compounds, etc. The classification and description of organic compounds is then begun along established lines with an occasional digression into the subjects of *reaction velocities, etherification constants, transition points*, etc. The hydro-aromatic compounds, including the terpenes and camphors, are followed by the aromatic compounds, which occupy the last 250 pages.

Most of the subjects of importance are adequately, and possibly more than adequately, described. I could find no reference to "steric hindrance," and I notice that the aeration holes in the vessel used in the quick vinegar process, which is figured on p. 157, are placed, as usual, below the false bottom instead of above it. J. B. C.

MODERN GASWORKS CHEMISTRY. By GEOFFREY WEYMAN, D.Sc., F.I.C. London: Benn Brothers, Ltd. 1922. Pp. 184. 25s.

Great progress has been made in recent years in the application of chemical knowledge to the operations carried on in the larger gasworks, and Dr. Weyman may be congratulated upon having compiled a book which is well abreast of the times and which will place in the hands of the modern gasworks chemist most of the information he requires concerning his work. Dr. Weyman refers his readers to Alwyne Meade's *Modern Gasworks Practice* for descriptions of manufacturing plant and processes.

After a brief introduction, dealing mainly with laboratory equipment and organisation of the chemical staff, the author describes the properties of coal and the methods of testing it. He then discusses carbonisation and methods of gas analysis. A chapter on coke includes a useful description of the apparatus required for the determination of arsenic in coke. Subsequent chapters deal with the maintenance of heats, refractory materials, tar, ammonia, purification, the examination of town gas, water-gas, steam generation and lubricants.

In the chapter on purification it is surprising that no mention is made of the Harcourt colour tests for sulphuretted hydrogen and carbon bisulphide, for these are still in common use. Dr. Weyman points out that the direct iodine method is erroneous owing to oxidation of the unsaturated hydrocarbon vapours.

With regard to the corrosion of iron pipes used for the distribution of gas there is often a tendency to attach too little importance to oxygen and, perhaps, too much to cyanogen. Dr. Weyman remarks that in the absence of oxygen and ammonia the cyanogen would probably be ineffective. H. F. H.

THE CHEMISTRY OF DENTAL MATERIALS. By Professor G. S. GIBSON, M.A. London: Benn Brothers, Ltd. Pp. 176. 12s. 6d.

This book is very welcome because it deals with the chemistry of dental materials as a whole, whereas in the past it has been necessary to deal with books on dental metallurgy, prosthetics and surgery in order to get a comprehensive view of the subject.

The first chapter is a survey of the use of various materials used in dental work, and is a valuable contribution to students' text books when starting on their dental metallurgy and their prosthetic study. Nevertheless, one feels that if the author had collaborated more with a practical dental surgeon, such mistakes as occur on page 22, viz., "that since aluminium can now be obtained so cheaply and of such a high degree of purity and with the better understanding of successful aluminium casting, the use of less clean and less durable tin alloys will gradually diminish," would not have occurred, as aluminium is primarily used for a light upper denture, whereas the tin alloys are used to increase the weight of a lower denture. We also fear that the author gives too much attention to the construction of celluloid dentures, as this material has been out of use for this purpose for many years.

In the chapter on general properties of metals, a large field has been well covered in a very concise manner, and is a fund of information for the student. We are surprised, however, to note on page 26 that zinc when hammered is more malleable than copper, because zinc has been used for years in dental dies, and it could hardly be used for such purposes if it had such a high degree of malleability.

The remainder of the book dealing with metals is most excellent for the purpose for which it was written, viz., for students studying the syllabus for the first provisional examination for the licentiate in dentistry of the R.C.S. in England, and the corresponding examination for the degree of Bachelor of Dental Surgery of the University of London.

Part 2, dealing with miscellaneous materials, is a most valuable contribution for students seeking knowledge about the syllabus already referred to, the chapter on rubber and vulcanite being of unique interest.

We can heartily recommend this book to all students, especially when the edition has been revised and such small printing errors as appear on pages 166 (30_2 instead of SO_2), and 169 ($C_{01}H_{61}$ instead of $C_{10}H_{16}$) have been corrected.

The diagrams are numerous and excellent, although perhaps it would be an advantage if those diagrams dealing with different types of furnaces, etc., could be given a little more explanation, such as Fig. 19, where the various parts are lettered but no explanation is given. W. KELSEY FRY.

"The Chemical Age Year Book"

WE give below a further selection of unsolicited references to THE CHEMICAL AGE YEAR BOOK, a limited number of copies of which are still on sale at 10s. 6d. :—

"I think the YEAR BOOK is admirable and hope to see future editions."—C. D. Y., Manchester, February 7.

"Many thanks for THE CHEMICAL AGE YEAR BOOK. It is a most worthy production, and promises to be a most valuable source of information. I read the 'Literary Section' with special interest."—B. P. H., Newcastle-on-Tyne, February 8.

"Very many thanks for THE CHEMICAL AGE YEAR BOOK. The publishers deserve great praise for such a useful work."—A. B., Leeds, January 25.

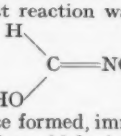
Photo-Synthesis of Plant Products

Recent Work on Organic Nitrogen Compounds

At the Royal Institution, on February 8, Dr. I. M. Heilbron gave a lecture on "Photo-Synthesis of Plant Products," in which he gave an account of his latest work in relation to the synthesis of the formation of organic nitrogen compounds. After reviewing the work of Pictet, Gadamer, Fischer and Baudisch, the lecturer said it could be taken that the chief source of nitrogen was probably potassium nitrate, which was present in the soil, or even ammonium salts; and the question now to be considered was whether, from one or other of these sources, the plant was able to synthesise the many complex nitrogenous substances found in the vegetable kingdom, and, of course, naturally, from the vegetable kingdom, forming the animal world.

From the results of the work carried out at Liverpool by Professor Baly and himself, he had no hesitation in stating that the answer was in the affirmative, and the key to the problem was to be found in the photo-synthesised activated formaldehyde. The carbon dioxide from the atmosphere, in the presence of water and sunlight, by means of the green pigment in the plant, synthesised formaldehyde—$CO_2 + H_2O = CH_2O$; or, as he preferred to write it, HCOH. This activated formaldehyde was the source of the proteins, however complex, that were found in the plant kingdom.

Interaction of Nitrates

Professor Baly and himself had been engaged in the study of the interaction of nitrates of this activated formaldehyde, and they had found that the first reaction was a substance known as formhydroxanic acid:  ; and they had found that this compound, once formed, immediately combined with more of the activated formaldehyde, and produced a great variety of complex nitrogenous substances similar to those which it was known occurred in the living leaf. The lecturer showed a sample of formhydroxanic acid, and also a solution of potassium nitrate in formaldehyde, the latter having been exposed for twenty-four hours to short-wave light, and emphasised the point that the blood-red colour of the two solutions was practically identical. They had also, he said, proved that if potassium nitrate solution was exposed to ultra-violet light, the absence of nitrate could be noted within a few minutes, and this reaction was a colour reaction for detecting nitrate, the red colour developing immediately. They had, therefore, proved that, starting with potassium nitrate under short-wave light, there was a reduction to potassium nitrite; and, in the second place, he had shown that potassium nitrite combined with active formaldehyde in the presence of light and gave formhydroxanic acid. The photo-synthetic production of formhydroxanic acid was first noted by Baudisch. Whether we started from carbon dioxide as the plant did, or whether we started from ordinary formaldehyde, the action of light in the first place was to convert either the carbon dioxide in water or the formaldehyde into active formaldehyde; and it could be proved if an ordinary formaldehyde or formalin were heated with potassium nitrite in the dark, when it would be seen that no reaction occurred whatever. There was no formation of formhydroxanic acid; whereas if ordinary formaldehyde and potassium nitrite were exposed to light formhydroxanic acid was formed.

Detection of Formhydroxanic Acid

Starting from carbon dioxide, as he had done with Professor Baly, they had been able to prove that, passing carbon dioxide into a potassium nitrate or nitrite solution in the presence of ultra-violet light, it was possible to detect formhydroxanic acid; therefore the carbon dioxide in water must have passed into formaldehyde, which then reacted to give the first assimilation product. He believed that was important, because ordinary formaldehyde, which was handled in the laboratory, was not the same as the formaldehyde synthesised in the green leaf of the plant. In the course of their experiments other facts of great importance had been noticed. It had been found that if they used an excess of nitrate or more nitrite than formaldehyde, formhydroxanic and nitrogen compounds alone were produced. If they employed an excess of formaldehyde above that required for the total nitrogen, then besides nitrogen compounds they obtained evidence of the production of sugars. It was apparent, therefore, that if in the leaf there was insufficient nitrite present, sugar formation could not possibly take place. Actually, however, the amount of nitrogen utilised by the plant was only about 5 per cent. of the total carbon, and consequently in the green leaf there was going on simultaneously both nitrogen assimilation and sugar formation.

If these views were correct, then the whole seat of activity was brought to the chlorophyll-containing leaf of the plant, both for the formation of nitrogen compounds and nitrogen from sugar, starch and cellulose. The experiments that had been put forward from time to time to prove that protein formation might take place in the stems and roots of plants in the absence of light were not conclusive, for the conditions were artificial, and there was no reason to doubt that the energy stored up in the sugars themselves could be utilised for protein formation. Such experiments did not militate against the arguments of Professor Baly and himself, that the green leaf was the essential laboratory for all plant products.

In their experiments, continued the lecturer, they prepared formhydroxanic acid artificially in the laboratory, and exposed it, in varying concentrations of formaldehyde, for varying periods, to short-wave light. The products which were formed varied considerably with the relative concentrations of the formhydroxanic acid and the formaldehyde; and the difficulties which were continually encountered in their attempts to isolate any one product were considerably increased by the remarkable velocity of the reactions which occurred. They found that substances were formed in the first hour or so, only to give place shortly afterwards to more complex compounds; but, despite apparently almost endless variations of such condensations, they found that there were three very definite ways in which an activated formaldehyde could condense with formhydroxanic acid. In the first place, they had definitely proved the formation of amino acids. That was a very big step in advance, because, for the first time, it was possible to look at a photo or light synthesis which would lead, and must lead eventually, to protein formation itself. He exhibited an amino acid, phenylaniline, which gave a characteristic colour reaction, the same as that obtained from the mixture which was the result of exposing formhydroxanic acid and formaldehyde to ultra-violet light. Another reaction gave varying colours, from claret to deep purple-violet; and he also showed a deeper burgundy colour, and added that, fortunately, here was proof that there was not one compound but at least four different amino acids formed in this manner.

Production of Alkaloids

In addition to forming amino acids, they had also obtained alkaloids, of this there was no doubt whatsoever; but owing to the difficulties of the work and the elementary way in which it had had to be carried out, they had not been able to accumulate sufficient of them to tell what type of alkaloids they were. One was certainly a volatile oil, with an odour resembling tobacco, and was possibly connected with nicotine.

There was still a third way in which the synthesis of formhydroxanic acid with formaldehyde could proceed, and that was to give a type of compound known as glyoxaline. It might assist if he mentioned that uric acid was really a glyoxaline derivative. They had synthesised cafeine and theo-bromine, and had had all the tests for glyoxaline residue; and if their assumptions were correct, that they had formed glyoxaline, then they held the key to the synthetic production of theo-bromine and cafeine. They had had substances in their hands which gave glyoxaline tests, but had not been able to identify the compound out of solution. They had had anything from 30 to 50 different types of compound in minute quantities, but exceedingly difficult to separate one from another.

Action of Ammonia on Formaldehyde

One other line of experiment carried out at Liverpool was as to the action of ammonia instead of nitrite on active formaldehyde, because there was every possibility that ammonium compounds were present in the plant. Working with ammonia, it had been found that, whether one started from carbon dioxide and ammonia, or from ordinary formaldehyde, on exposure to light the same compounds were obtained. In all cases they had proved the presence of a simple base

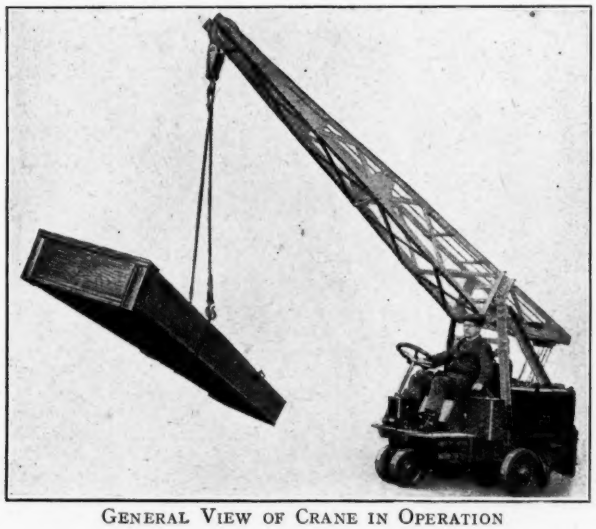
known as methylamine, and also the two bases pyridine and and piperidine. It was of interest to note, also, that they had been able to photo-catalyse the reaction without the necessity for using short-wave light. If they used an ammonium carbonate solution containing copper, they had been able to detect the presence of pyridine in ordinary sunlight, and that was a reaction analogous to the chlorophyll reaction in the plant. Having ascertained the formation of pyridine, it occurred to Professor Baly and himself as of interest to see whether the reaction between ammonia and activated formaldehyde stopped with the formation of the pyridine structure. They had found evidence of other substances, and the pyridine structure immediately implied, probably, the formation of alkaloids. They had been able, by the aid of ultra-violet light, actually to isolate one of these substances in a fairly pure state, the alkaloid conine, or an alkaloid extraordinarily closely related to this natural product, and attempts were being made to prepare larger quantities in order to determine exactly its true constitution.

In conclusion, the lecturer gave some general deductions, which he thought could safely be drawn from the experiments. He emphasised the point that plant synthesis, both of nitrogen compounds and of carbo-hydrates or sugars, could only take place in the leaves, and stated his belief in the possibility of carrying out the various reactions on a large scale. He considered it by no means impossible to reproduce in the laboratory processes analogous to those which actually took place in the plant. Further, he felt there was justification for suggesting that the methods used in the laboratory were comparable with the methods of the plants.

An Electric Runabout Crane

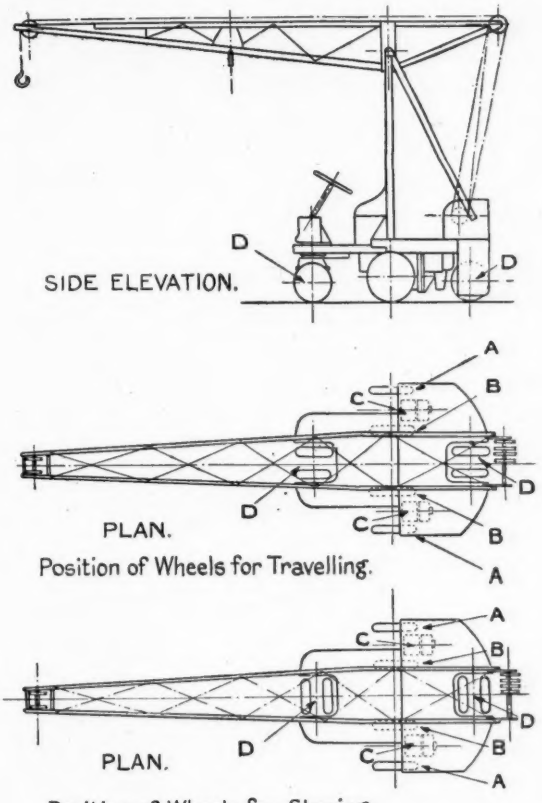
A Study in Mechanical Handling

MOBILITY is, perhaps, the most striking feature of the new "Ransome" electric runabout crane, of which some demonstrations were given to a party of guests at the Ipswich works of Ransome, Sims, and Jefferies, Ltd., the other day; and with mobility is associated the essential factor of stability without undue weight. On the open floor of a garage one saw the crane, operated by one driver, revolve on its own axis, run forward and backward at almost any curvature, and take up practically any desired position. Rapidly and easily it picked up packages of various sizes and weights, very



GENERAL VIEW OF CRANE IN OPERATION

much as a workman might pick up small articles, carried them to the desired point, and comfortably deposited them wherever required. The variety of its operations and its freedom of movement in a limited space impressed one immediately. Later we saw it at work in an open yard, easily lifting great logs of timber and stacking them in orderly fashion with the aid of one man. Later still it rambled off on a tour, passing hrough low and narrow doorways, crossing rough and uneven ground intersected by tram lines, running along the dock-side, and dodging in and out among railway wagons. Finally, in a narrow roadway it unloaded from a lorry a number of heavy cases direct into a railway wagon. Shortly, it may be said that it went almost anywhere a workman might go, and performed its functions of lifting, carrying, and depositing, in



a variety of positions that supplied very searching tests, without the slightest hitch. For docks, works, warehouses, or anywhere where mechanical handling is practised, a handier or more efficient piece of machinery could hardly be imagined.

The illustration and diagrams will convey some idea of the appearance and mechanism of the crane. It travels, turns, hoists and derricks under its own power, which is supplied by a battery of electric accumulators. It turns about its own centre on the road wheels. It is made in three sizes, 7½, 15 and 20 cwt., and each size is made in two types—one for passing under doorways approximately 7 ft. 6 in. high, and the other for passing under doorways approximately 10 ft. high. All sizes of both types will pass through a gangway having a clear width of 5 ft. 4 in., and will rotate in a 7 ft. 6 in. circle. The wheel system is so constructed that the crane will adapt itself to moderately uneven ground without detriment to its operation. It will negotiate and operate on gradients up to 1 in 10. The pressure on any wheel under the worst conditions of loading never exceeds ¾ ton, and this conduces to long life of the tyres and easy steering. The fundamental principle is new. There is no turn-table to enable the crane to swivel independently of the chassis frame. Instead, the crane is fixed on the chassis and the jib is always in the same position relatively to the chassis, so that there is no variation of the stability factor as the load is slewed.

Among the company present at the demonstrations were Mr. Pawlyn, Mr. Ayton, and Mr. Goodwyn, directors of Ransome, Sims, and Jefferies, Ltd.; Colonel Ionides, Director of Ransomes and Rapier, Ltd. (who manufacture the crane portion); Mr. P. A. Mossay and Mr. Makower, the designers; Mr. Phillips, electrical works engineer; Mr. Hughes, electrical engineer, and Mr. C. J. Palmer, publicity manager.

January Trade Returns

Chemical Exports increased by £621,000

A SUBSTANTIAL improvement in chemical exports is reflected in the Board of Trade Returns for January, the total —£2,247,301—being £621,972 more than for the preceding month and £232,507 in advance of January, 1922. Imports, at £1,223,593, are £224,050 more than in December, and £459,111 above the total of the January of last year.

Sodium Nitrate Imports

The principal feature of the month on the import side is a very largely increased buying of sodium nitrate, while on the export side the general improvement in coal tar products, especially tar oil and creosote, is particularly noticeable. Sulphate of ammonia shipments show a further advance, the tonnage exported being considerably in advance of foreign sales in the corresponding months of the last three years. A new heading, including exports of " disinfectants, insecticides, weed killers, sheep and cattle dressings, except tobacco offal, containing no dutiable ingredient " has now been incorporated in this section of the returns, the total for the month being 34,900 cwt. valued at £84,282.

The detailed import figures for the month, in cwts., unless otherwise stated, are given below, with the December figures in parentheses :—INCREASES : Acetic acid (including acetic anhydride), 508 tons (303) ; calcium carbide, 67,356 (62,633) ; crude glycerin, 747 (562) ; distilled glycerin, 363 (215) ; potassium nitrate, 31,365 (13,312) ; potassium compounds other than nitrate, 329,221 (308,073) ; sodium nitrate, 230,502 (72,040) ; sodium compounds other than nitrate, 42,340 (26,798) ; cream of tartar, 4,326 (3,833) ; and zinc oxide, 657 tons (610). DECREASES : Tartaric acid, including tartrates not elsewhere specified, 2,154 (2,256) ; bleaching materials, 3,804 (3,830) ; borax, 2 (5,477) ; red lead and orange lead, 2,925 (5,241) ; and nickel oxide, 2,140 (3,407).

Recovery in Coal Tar Products

With very few exceptions exports of chemicals were higher. The only noticeable decreases were in respect of bleaching powder, glycerin (both crude and distilled), certain potassium compounds, and sodium sulphate. Shipments of sulphate of ammonia amounted to 23,836 tons of the value of £409,462, as compared with 17,954 tons valued at £302,666 exported in the preceding month. An unusually large proportion of sulphate—9,816 tons—went to Spain and the Canaries. France came second with 4,884 tons, and was followed by the Dutch East Indies, with 3,903 tons ; Japan with 2,003 tons ; the British West India Islands and British Guiana, with 508 tons ; and Italy, with 157 tons. Other countries, the names of which are not given, absorbed 2,565 tons.

The following figures show in detail the products, the January exports of which were larger (as to quantity) than in the preceding month ; the December totals are given in parentheses and the figures represent cwts., unless otherwise stated :—Sulphuric acid, 1,157 (758) ; tartaric acid, including tartrates not elsewhere specified, 2,724 (2,522) ; ammonium chloride (muriate), 569 tons (412) ; sulphate of ammonia, 23,836 tons (17,954) ; anthracene, 200 (nil) ; benzol and toluol, 4,495 galls. (1,977) ; carbolic acid, 8,036 (7,500) ; naphtha, 4,311 galls. (2,239) ; naphthalene, 13,528 (7,910) ; tar oil, creosote, etc., 4,627,684 galls. (380,089) coal tar ; products not elsewhere specified, 42,444 (25,414) ; copper sulphate, 3,111 tons (859) ; potassium chromate and bichromate, 3,572 (3,248) ; sodium carbonate (including soda crystals, soda ash, and bicarbonate), 582,810 (467,168) ; caustic soda, 147,257 (123,055) ; sodium chromate and bichromate, 7,522 (4,571) ; sodium compounds other than the foregoing and sulphate and saltcake, 58,330 (42,835) ; and zinc oxide, 204 tons (150).

The decreases, similarly compared, are :—Crude glycerin, 232 (1,473) ; distilled glycerin, 5,079 (6,921) ; potassium nitrate, British prepared, 914 (2,061) ; potassium compounds, other than chromate and bichromate, and nitrate, 933 (1,925) ; and sodium sulphate, including saltcake, 81,943 (133,763). Chemicals, all other sorts—no quantities are given—appear as £296,714, an increase of £21,639 on the December exports.

Big Importation of Synthetic Indigo

Notwithstanding the fact that less alizarine and synthetic ndigo came into the country in January than in December last, the figure for the latter product is still very much higher than has been usual of late years.

Imports of other classes of dyestuffs were mostly larger, but dyeing extracts all fell off. The comparative import figures for December last and January of this year are, respectively :—Coal-tar intermediates, including aniline oil and salt, and phenyl-glycine, 86 (1) ; alizarine, 793 (1,968) ; synthetic indigo, 5,050 (5,107) ; finished dyestuffs, other sorts, 4,011 (3,475) ; cutch, 5,075 (7,525) ; extracts for dyeing, all other sorts, 9,530 (10,792) ; natural indigo, 15 (17) ; and extracts for tanning, solid or liquid, 79,825 (97,509).

Dye Exports Improving

Exports of dyes and dyestuffs show substantial improvement, the total of 10,468 cwt., of the value of £56,580, being more than the December figures by 3,102 cwt. and £8,504. The month's exports were made up of 3,871 cwt. of coal tar products, worth £46,578 (as compared with 3,603 cwt., valued at £41,343) and 3,763 cwt. of other sorts, of the value of £10,002 (as against 3,763 cwt., sold for £6,733). In January, 1922, 9,494 cwt. of dyes, worth £73,747, left the country.

Painters' Colours and Materials

Every item under this heading, whether imported or exported, shows an increase over the December figures. The comparative figures for December and January are :—IMPORTS : Barytes, ground, including blanc fixe, 76,355 (52,538) ; white lead (basic carbonate), 12,216 (12,165) ; and painters' colours and materials, other sorts, 46,072 (41,840). EXPORTS : Barytes, ground, including blanc fixe, 9,994 (1,463) ; white lead (basic carbonate), 15,365 (13,858) ; paints and colours ground in oil or water, 39,336 (25,924) ; paints and enamels, prepared, including ready mixed, 20,910 (19,901) ; and painters' colours and materials, other sorts, 49,948 (39,529).

Nitrate Market Position

An increased Continental Demand Predicted

IN their fortnightly nitrate circular, dated February 5, Aikman (London), Ltd., state that the arrivals amount to about 56,000 tons, and that about 70,000 tons are due during the next fortnight.

The market during the fortnight has been very unsettled owing to the violent fluctuations in continental exchanges, and consumers have as a result abstained from purchasing all other than their immediate requirements. Business has in consequence been restricted to the sale of a few steamer parcels for near arrival at £12 12s. 6d. to £12 10s. per ton c.i.f., with closing values about £12 7s. 6d. per ton c.i.f. for near and February-March shipment. Continental dealers remain optimistic as to prospects of consumption, and predict a large demand in the near future. At the close there are already evidences of improved inquiry from consuming centres.

The Producers' Association have sold during the fortnight 39,000 tons, of which 27,000 are for January-April and 12,000 for June shipment, making their total sales for shipment from July 1, 1922, to April 30, 1923, 1,408,000 tons, and 172,000 tons for shipment in June, 1923. Including all sales by the Producers' Association, by the German companies, and by others outside the association, for shipment up to April 30, 1923, it is estimated that about 305,000 tons had not been shipped up to February 1, of which quantity about 150,000 tons were bought for Europe, 120,000 tons for America, and 30,000 tons for other countries.

Continued American Demand

The demand in the United States continues good, and if, as is expected, no further quantities are offered *ex* the Government reserve stock (after the 28,000 tons now out for tender has been placed), considerable further purchases from the Producers' Association are probable. Of the sales made by the association during the fortnight about 10,000 tons were bought by American importers.

The visible supply position (in tons) as at January 31 is as follows : Europe and Egypt, 472,000, against 872,000 in 1922, 887,000 in 1921, and 1,128,000 in 1914 ; United States, 233,000, against 266,000 in 1922, 274,000 in 1921, and 89,000 in 1914 ; Japan and other countries, 34,000 against 32,000 in 1922, 17,000 in 1921, and 20,000 in 1914 ; stocks in Chile, 1,127,000 against 1,451,000 in 1922, 1,320,000 in 1921, and 490,000 in 1914 ; total, 1,866,000, against 2,621,000 in 1921, 2,498,000 in 1921, and 1,727,000 in 1914.

Use of the Title "Chemist"

Mr. R. B. Pilcher on Proposed Restrictions

LECTURING before the Northern Polytechnic Chemical Association on Tuesday, Mr. R. B. Pilcher, Registrar of the Institute of Chemistry, illustrated by means of extracts from various authors the difference in the significance of the words "alchemist," "apothecary," "chemist," and "druggist." Since the dark ages of alchemy, said Mr. Pilcher, the word "chemist" had been used both for the philosophical investigator and the man who made chemical substances.

The Pharmacy Act of 1868 having been passed before the foundation of the Institute of Chemistry, in 1877, difficulty was experienced immediately the founders sought to name it the "Institute of Professional Chemists." Opposition came less, however, from the Pharmaceutical Society than from the Privy Council and the Board of Trade. Continuing, the lecturer said the distinction between chemistry and pharmacy was indicated by the titles of the two chartered bodies representing the respective professions. If this distincton had become generally recognised by members of both professions and by the public, there would undoubtedly be a strong case for giving statutory effect to it by an enactment prohibiting the use of the title "chemist" by persons not qualified in the profession of chemistry as it was understood by the Institute. Unfortunately this was not yet established. Pharmacists and druggists continued to call themselves chemists, and, notwithstanding the definitions appearing in dictionaries, appeals to history and literature, or to the custom of other countries, the word "chemist" still suggested to the majority of the public primarily the person who sold them medicine. The Pharmaceutical Society had never attempted to apply the Acts so as to prevent analytical and technological chemists from using the title "chemist," while many of its members were not only in favour of that of "pharmacist," but actually used it.

Registration for Practice

The question of restricting the use of the title was, he thought, inseparable from that of registration for practice; and if the practice was restricted, the people to whom it was restricted must be defined. Restriction must be for some purpose other than the encouragement of the proper use of a word. Under any measure of restriction it would be necessary to register for a long period many persons of a standard very different from that represented by the present register of the Institute of Chemistry; at present the public did know where to look for competence with a certainty of finding it.

With regard to suggestions for the inauguration of something akin to the mariner's certificate for controlling dangerous industries, Mr. Pilcher, said that if the certificate were specialised in character the chemist would find it difficult to change his position, and if it were general in character it would be useless for practical purposes. Notwithstanding these difficulties, many were in favour of doing something towards restriction. His own belief was that, without waiting 50 or 60 years for the possession of legal powers of doubtful utility, the public would learn through the work of the chemists themselves, and through organisation under the Institute, to call a chemist by his proper name.

Chemists themselves should use their own title and speak of pharmacists as such. The lay Press should be asked to use the distinctive titles in their true significance. An appeal should be made to pharmacists to foster this movement for the sake of fair play to the profession to which they must look for the scientific knowledge which was the basis of the manufacture of many of the materials employed in their craft.

Finally, chemists should be definitely represented in Parliament. Indeed, he thought that the time had come when professions as well as universities should be represented.

To the Editor of THE CHEMICAL AGE.

SIR,—As a constant reader of THE CHEMICAL AGE, I am pleased to read of your helpful work for the younger school of chemists. I am therefore taking the liberty of asking you to help me to find a post of any nature in which my training may be of use. I am 21 years of age, and have graduated recently (B.Sc. Hons. Chemistry, London University).

Thanking you in anticipation.—Yours, etc.,

February 12, 1923. H. H. B.

The Ruhr and British Dyes

To the Editor of the CHEMICAL AGE.

SIR,—Whether the commercial community approves or disapproves of the occupation of the Ruhr, that action has had one consequence which must interest not only most men of business as such, but in general the taxpayers of this country, I mean the ban upon German dyes. The ban is as thorough as it is, of course, deliberate. An embargo has been placed upon the despatch of tar, benzol, and the other raw materials of Germany's dyestuffs industry; lignite, the coal substitute, has been confiscated; transport, whether by rail or Rhine, has been dislocated; and, finally, there comes the announcement that France begins to occupy German dyestuffs factories.

In a word, what is happening is not only the isolation of the Ruhr from Germany, but the isolation of Great Britain from German dyestuffs. Is it not fortunate, then, that we have already had the experience of being cut off from German dyes—first during the war, afterwards in the period of disorganisation that followed it? We know where we are; for if the British textile trades were able, with the help of British dyes, to take the fullest advantage of that post-Armistice boom, which was one of the most extraordinary in their history, they will not be less independent to-day, when the range of our dyestuffs is much bigger than it was then. Yet where would we have been now without the Dyestuffs Act that has made possible an industry on which £200,000,000 worth of our country's trade depends? The enemies of our dyes policy will do well to greet in tactful silence, if not with tardy penitence, this crisis in the Ruhr which, had they been given their way, would certainly have meant a crisis in British factories.—Yours, etc.,

House of Commons. N. GRATTAN DOYLE.

February 14, 1923.

Unemployed

To the Editor of THE CHEMICAL AGE.

SIR,—As a regular reader of THE CHEMICAL AGE, and as a young chemist looking for a post, I have naturally been interested in the articles on "Young Chemists" which have appeared in your paper during the last three or four weeks. At the present time the number of chemists who are being turned out from the Universities and colleges may be considerably in excess of the number which can be annually absorbed into the chemical industry, but at the same time there appears to be lacking, on the part of senior chemists, that "helping hand" which a young chemist looks for when he is applying for his first appointment.

During the last two months I have applied to well over 50 chemical firms, chiefly in the Lancashire and Cheshire district—the district I want to settle in, if possible—and in practically every case I have received the same reply. I am 26 years of age, and spent five years in the army, the greater part of the time with a commission, on active service, and frequently holding responsible positions. As soon as I was demobilised I continued my studies in chemistry under a Doctor of Science (London) and a F.I.C., under whom I have been studying during the last three years. I have successfully passed an examination for a Diploma in Chemical Engineering, and, in addition, I have been working for a London B.Sc. (Hons. Chem.). I hope to have this degree, and also to be an Associate of the Institute after the next examination in October. I also have had considerable experience in organisation and the control of men.

In view of the fact that my training was so much interrupted by the war, I am sure you will see why I am so anxious to receive a post with a salary without further delay. Although in the eyes of most chemists I am not fully qualified, I think I have reached that stage where I am competent enough to receive a first appointment as junior chemist when my age and war service are taken into account. I do not, of course, look for a large salary to commence with, but look more for an opportunity of getting practical experience, and if you can help me in any way I shall be very grateful, and will send you further particulars of my training and qualifications.

I am sure there must be many other men similarly placed who are anxious to get posts before next July, when so many more younger men who have seen no war service will be looking for employment as chemists.—Yours, etc.,

February 13. Q. V.

New Rubber Accelerators

The Work of British Dye Chemists

THE importance of the new rubber accelerators which have been perfected by British chemists has been explained to an interviewer by Major V. Lefebure who is responsible for the development department of the British Dyestuffs Corporation.

The use of rubber, he stated, was greatly restricted until about eighty years ago, when a few pioneers discovered that it acquired valuable properties when associated with sulphur. It was only then that rubber began to come into its own; yet, up to some ten years ago, if it was desired to combine rubber with sulphur in this way, it was necessary to use a temperature of 140° C. or more for almost every type of rubber goods. For a thicker article like ebonite or vulcanite this temperature had to be maintained for many hours; in the case of the thicker kinds of ebonite sometimes for twenty hours at a time.

After detailing the process of acceleration, Major Lefebure stated that the use of synthetic organic chemicals in this way had been a landmark in the development of the rubber industry.

In America, he continued, there are very few rubber articles which are not made by the use of these accelerators, but in England we have been slower in developing. An important new feature which has now come into the situation is that these accelerators are all synthetic organic chemicals, which are either actually intermediates in the dye-stuffs industry, or can easily be made from such intermediates. We have perfected products with special suitability for different types of rubber. Up to within a year ago it was fairly true to say that the British rubber industry was largely dependent on chemicals from foreign sources for this purpose, although there were certain exceptions. Rubber manufacturers were even using chemicals under trade names without knowing what the chemicals were or without being sure that they could rely on getting them in, say, a year's time if they wanted to repeat them for any particular department of their work. Now that the British chemical industry has taken on the production of them it will be possible to supply the rubber industry with satisfactory products for all types of rubber production.

Alluding to the important results which would follow, Major Lefebure mentioned that the range for useful articles in rubber, although wide, had been seriously limited owing to the fact that rubber has had to be vulcanised at 140° C. and over a long period of time, and that many materials which would probably compound quite satisfactorily with rubber under less drastic heat treatment have had to be ruled out because of that high temperature. The possibility is now in sight of using such products, and a good range of colours, for rubber flooring, hot-water bottles, and so on, is also made possible.

Major Lefebure added that this development was important too, from the point of view of national defence because the greater our range of organic chemicals, the greater would be our margin of safety to cover every new aggressive compound that might be devised by an enemy. Putting a new product on the national range of synthetic organic chemicals was, he said, like building a new submarine, with the inestimable additional advantage of industrial progress. Perhaps, however, the most immediately interesting result of the new enterprise would be that the cost of rubber articles might fall. The process not only kept down the steam consumption, but it also allowed the output of a given plant to be substantially increased. A new range, or an addition to the range, of British-made synthetic organic chemicals was of direct interest and importance to every individual in this country.

Setback in Chilean Nitrate Sales

A MESSAGE from Valparaiso to the Anglo-South American Bank, Ltd., dated February 7, says that, although sales of nitrate have been on a rather larger scale, the tendency in the exchange market is still somewhat dull, and a moderate recovery in rates has been followed by a renewed setback. Sales of nitrate during the week amounted to 168,132 metric quintals, of which 36,932 quintals were for delivery during the present month, and 131,200 for June. This brings the total amount disposed of since the sales were resumed in May last to 16,267,475 metric quintals.

Oil and Colour Chemists

Paper on Viscometry and Plastometry

AT a meeting of the Oil and Colour Chemists' Association, held at Birkbeck College, London, on February 8, Mr. A. de Waele read a paper on "Viscometry and Plastometry." The President (Dr. Newton Friend) was in the chair.

Mr. de Waele said the subject of the determination of the degree of plasticity in solids was not a new one, but the recent work of Bingham and his collaborators had been responsible for the creation of a good deal of interest among paint technologists recently. As plastometry was but a development of viscometry, a study of the latter was necessary as an introduction.

The author then treated viscometry from the elementary point of view, stating that his own personal criticism against the Redwood viscometer was mainly that of the cost of the instrument; a simple glass Ostwald viscometer was much cheaper. Both instruments, however, suffered from the drawback that their calibration to absolute values was impracticable except by reference to a standard. Castor oil and glycerol appeared to be the only representatives of easily obtainable fluids of high viscosity, and he need not enlarge upon the inadequacy of these liquids as absolute standards.

Consideration was then given to the question of viscosity from first principles, and it was stated that since viscosities of true viscous liquids should be returned in terms of absolute units, any form of efflux apparatus wherein the dimensions of the capillary were open to measurement and the shearing pressure could be determined, might be used. It was thus obvious that none of the common forms of efflux apparatus was available for the purpose. If a series of capillaries covering a range of speeds were available, and these were calibrated with liquids of known viscosities, calibration against a standard could be performed.

Direct Determination of Viscosity

A slide was then shown of an apparatus which, it was claimed, would serve either for the direct determination of viscosity or for the absolute measurement of any standard to be adopted. It did not, the author said, share the ease of manipulation of the plastometer to be described, but it had the merit of being easily made from the commonly available materials of the laboratory. As it required two manipulators, the author suggested its application for the checking of standards, Ostwald or Ubbelohe viscometers being actually used when once standardised. This form of viscosity apparatus did not require any calculation of density of the liquid.

A description was then given of the plastometer, the principle of which differed in no way from the efflux viscometer, excepting that higher pressures of shear were available than could conveniently be obtained by a head of liquid. The apparatus consisted essentially of four parts—a viscometer proper, comprising a container, capillary and receiver; an air chest adapted to act as a pressure stabiliser, and an air cushion; a measuring manometer registering up to 280 cm. of mercury; and a flow-meter or anemometer. The meter proper contained paraffin oil with a trace of oleic acid to lower surface tension, the level being adjusted to give the minimum movement in the vertical limb. The calibration of the flow-meter was carried out by the method of comparing readings at various pressures against the mean volumes exuded at these corresponding pressures for a homogeneous viscous liquid. The thermostat consisted of a large accumulator jar filled with water, immersed in which are a carbon filament lamp and a capsule thermo-regulator.

Experiments on Plasticity

Having explained the method of operating the apparatus, Mr. de Waele dealt in a comprehensive manner with plasticity, describing experiments which have led him to the conclusion that Bingham's theory has not been substantiated experimentally. The author decided to explore a region of shear hitherto not attained by other workers by employing considerably higher pressures in conjunction with capillaries with which a greater velocity gradient could be obtained. This work was explained in some detail, and was put forward as further confirmation of the view that Bingham's conclusions were erroneous. Finally, the author added that the paper was inspired by Mr. E. Hatschek's persistent doubting of the possibility of plastic flow being at any point comparable in its mechanism with viscous flow.

Rubber Vulcanisation Problems

Comparative Advantages of Hot and Cold Cures

THE second of the three Cantor lectures which Dr. H. P. Stevens is giving before the Royal Society of Arts, in London, was delivered on Monday. (The previous lecture was reported in THE CHEMICAL AGE last week.) In this second lecture he discussed hot and cold methods of vulcanisation, pointing out the degrading effect of heat on raw rubber. He also drew attention to the considerable variations disclosed by the figures for maximum breaking strains of different test pieces from the same specimen of vulcanised rubber, and of the same dimensions, obtained by various investigators, for which no adequate explanation was forthcoming.

Dr. Stevens next considered alternative methods of vulcanising. The method of milling the raw rubber till plastic, mixing with sulphur and heating, provided a suitable temperature was reached and maintained, and provided also that the rubber was protected from air, brought about a satisfactory change. The effect of vulcanisation could be obtained by means other than the action of sulphur and heat, such as the use of polysulphides of the alkali metals, and also by the use of nascent sulphur. Peachey had found that the exposure of rubber to hydrogen sulphide, giving time for the gas to be absorbed, and subsequent exposure to sulphur dioxide, resulted in a reaction between the two gases dissolved in the rubber, the liberated sulphur combining with the rubber. This was regarded as due either to the action of atomic sulphur or to the intermediate formation of thiozone, which then liberated sulphur in an active state. If this latter interpretation were correct we should expect the liberation of two atoms of sulphur in the molecular state for every third atom which reacted with the rubber. As, however, the Peachey process could be carried out so that practically the whole of the liberated sulphur combined with the rubber, there did not appear any evidence favouring the intermediate formation of thiozone.

Use of Hydrogen Persulphide

The author referred next to Bloch's discovery that rubber could also be vulcanised in the cold by hydrogen persulphide. This in theory should split off one or more atoms of sulphur to combine with the rubber, at the same time liberating one molecule of hydrogen sulphide. Although he (Dr. Stevens) had carried out this reaction on several occasions, he had not succeeded in obtaining a vulcanising effect without the liberation of free sulphur. In the presence of acid, hydrogen persulphide was stable, and he had found that so long as acid was present no reaction with the rubber took place, but if the acid were neutralised sulphur and hydrogen sulphide were liberated and a portion of the former combined immediately with the rubber. His own experiments had led him to the conclusion that the amount of sulphur liberated as such was always appreciably greater than that combining with the rubber. Both these cold processes mentioned resulted in vulcanised rubber which closely resembled that obtained by heating with sulphur. Under favourable circumstances the Peachey process yielded a vulcanised product of greater tensile strength than that obtainable by the ordinary sulphur and heat process, and a smaller proportion of combined sulphur was required to produce the same physical effect in the Peachey process than in the heat process. Of the Bloch process he had only the impression conveyed by the handling of small vulcanised films, but these appeared to be particularly tough. If his conclusions were confirmed, they were readily explained by the fact that these processes took place in the cold, and consequently vulcanisation was not accompanied by the degrading effect of preliminary mastication when followed by heating, as ordinarily employed for rubber vulcanisation.

There were other substances, such as the thiuram disulphides and certain other complex organic sulphides which readily parted with some of their sulphur, and consequently vulcanised rubber. This type of vulcanising agent was more effective in the heat, and it also facilitated the combination of elemental sulphur with rubber.

Dealing with vulcanising agents other than sulphur, Dr. Stevens said that selenium, which produced an effect similar to sulphur, had no practical importance. The sulphur monochloride process (discovered by Parkes) which was used particularly in the proofing industry, and was commonly known as the cold cure, was almost instantaneous, and it was necessary to dilute the sulphur chloride to a two per cent. solution in carbon bisulphide to moderate the reaction.

Finally, natural and inorganic accelerators were dealt with, and in regard to the former Dr. Stevens pointed to the fact that in the tropics, if the latex or wet coagulum therefrom were set aside for 24 hours, putrefaction set in. It had been found that the rubber from such putrefying coagulum vulcanised faster than that worked up promptly. It vulcanised the faster the longer it was left up to a period of about a week, after which no advantage was obtained by allowing putrefaction to continue. The rubber was found to contain simple organic bases separable as phosphotungstates, which accelerated vulcanisation.

Society of Public Analysts

New Officials for the Year

The annual general meeting of the Society was held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, February 7, when the President, Mr. P. A. Ellis Richards, delivered his annual address (of which a summary appeared in THE CHEMICAL AGE last week).

The following were elected officers for the ensuing year :—President—Mr. P. A. Ellis Richards ; Past presidents serving on the Council—Messrs. Leonard Archbutt, A. Chaston Chapman, Bernard Dyer, Otto Hehner, Samuel Rideal, Alfred Smetham, E. W. Voelcker, J. Augustus Voelcker ; Vice-presidents—Messrs. F. W. F. Arnaud, F. H. Carr, G. W. Monier-Williams ; Hon. Treasurer—Mr. Edward Hinks ; Hon. Secretary—Mr. E. Richards Bolton ; Assist. Hon. Secretary—Mr. R. G. Pelly.

Other Members of Council—Messrs. H. Ballantyne, S. F. Burford, S. Elliott, B. S. Evans, E. M. Hawkins, Harri Heap, H. F. E. Hulton, Andrew More, A. E. Parkes, W. R. Schoeller, G. R. Thompson, J. F. Tocher.

At an ordinary meeting on the same date certificates were read for the first time in favour of Messrs. J. J. Backes, A.R.C.Sc., A.I.C., D.I.C., S. G. Stevenson, A.I.C., R. W. Sutton, B.Sc.Tech. (Manch.), A.I.C., L. B. Timmis, M.Sc.Tech. (Manch.), A.I.C., A. E. Johnson, B.Sc. (Lond.), F.I.C., A.R.C.S.I., E. V. Jones, F.I.C., and F. K. Donovan, B.Sc. (Lond.).

Certificates were read for the second time in favour of Messrs. G. H. Appleyard, F.I.C., J. W. Black, B.Sc. (Lond.), A. W. Starey, A.R.C.S., B.Sc., A.I.C., and J. M. Wilkie, B.Sc. (Lond.), F.I.C.

The following were elected Members : Messrs. H. A. Bromley, W. H. Clulow, W. P. L. Hope, B.Sc. (Edin.), A.I.C., R. F. Innes, F.I.C., O. Jones, F.I.C., A. W. Stewart, D.Sc. (Brux.), A.I.C., W. H. Thorns.

Abstracts of Papers

From a paper on "Titanium in Nile Silt," by Mr. E. Griffiths-Jones, it appeared that the author had examined silts from various parts of the Nile and determined the titanium by a colorimetric method after freeing the sample from silica. Amounts varying from 1·3 to 2·55 per cent. of titanium oxide on the dried silt were found, but an examination of Egyptian straw, a likely source of titanium, only showed 0·4 per cent. of titanium oxide on the ash.

In some "Notes on the Examination of Preserved Meats, etc." Mr. Osman Jones, F.I.C., stated that the presence of a trace of zinc chloride in the tin container (which sometimes arises through the use of this salt as a soldering flux) caused a more rapid absorption of tin by the food contents, and that the use of a sealing fluid containing a high boiling point solvent caused a disagreeable flavour to be imparted to the food material. Methods for the detection of such a solvent were given. The absorption of tin by the meat contents of a can was found to be greatest at the time of processing and almost to cease after about four months. The author also mentioned a test for agar in the presence of gelatine—a dilute solution of iodine in potassium iodide gives a crimson colour with agar, while with gelatine an orange-coloured precipitate is produced.

British Cast-Iron Research.

THE RESEARCH COMMITTEE of the British Cast-Iron Research Association have appointed as research assistants Mr. E. C. Dickinson, who will work at the Sheffield University, and Mr. K. J. Simcox, to work at the Birmingham University.

New British Chemical Standard

Basic Slag "A"

(Analytically Standardised Sample)

The organisers of the British Chemical Standard movement announce the issue of a basic slag standard. The special uses of the slag are :—(1) Primarily as an analytical standard for total phosphoric acid and phosphates ; (2) In addition, as a standard mainly for basic steel makers, but also for acid steel makers, iron and steel founders and others, to enable them to check their methods for silica, iron, lime and magnesia, etc., in slag. The analysis is as follows :—

Phosphoric anhydride (P_2O_5)	12·93 per cent.
Equal to phosphates ($Ca_3P_2O_8$)	28·24 ,,
Iron	8·97 ,,
Silica	16·15 ,,

During the standardisation of this slag the need for such a standard has been made abundantly evident, for it has been found that even in the determination of such elements as iron, silica, lime and magnesia, which, it may be thought, present little or no difficulty, improvements in methods have been essential in order to get agreement between experienced chemists. The standard has been tested by a selection of 16 prominent chemists representing independent analysts (metallurgical and agricultural), and U.S. Bureau of Standards. English and French iron and steel works chemists (manufacturers), and English basic slag grinders and merchants.

This standard has been prepared with the object of promoting unification of analysis, and particulars may be obtained from the headquarters, 3, Wilson Street, Middlesbrough.

Failure of a Chemical Manufacturer and Merchant

The first meeting of creditors under a receiving order made against Alfred Norris, late of 107–111, Moorgate Station Chambers, London, E.C., on January 3, was held recently at the London Bankruptcy Court. In a preliminary examination the debtor had stated that in 1916 he obtained an appointment as sales manager to a company carrying on business as chemical brokers, and 18 months later he was appointed a director of the company, but he resigned in March, 1918. He then formed Norris Brothers, Ltd., with a capital of £5,000, to carry on business as chemical manufacturers and merchants at 109-111, Moorgate Station Chambers, London, E.C. He was originally allotted 2,000 shares, but his present holding was 3,600 shares. He attributed his failure to liabilities incurred as guarantor for Norris Brothers, Ltd., and for another company. No statement of affairs had yet been filed, but he estimated his liabilities at £4,000, and his assets consisted of shares in Norris Brothers, Ltd., of uncertain value, and three life policies which were charged to a bank. The case was left in the hands of the Official Receiver.

An Association of Glycerin Producers

The United Kingdom Glycerin Producers' Association, Ltd., was registered on February 10 as a company limited by guarantee, and not having a capital divided into shares, with 100 members, each liable for £10 in the event of winding up. The objects are : To acquire and deal in and act as agents for members in storing and delivering all or any kinds of glycerin, whether crude, saponification, soap lye, dynamite, chemically pure or otherwise, etc. The management is vested in a council, the first members of which are :—J. Lever Ferguson, Bidston, Cheshire, soap manufacturer ; F. G. Hunt (director of Joseph Crosfield and Sons, Ltd.) ; E. Walls, Bristol, soap manufacturer ; J. Hacking, Clayton-le-Moors, near Accrington, soap manufacturer ; G. Ferguson, Glasgow, soap manufacturer ; C. R. Baker (director of Joseph Watson and Sons, Ltd.) ; C. Radburn, Lyford Road, Wandsworth Common, S.W.18, manufacturer. The registered office is at Gresham College, 87-89, Basinghall Street, E.C.2.

Practical Manuring of Sugar Beet

A new leaflet bearing the above title has just been issued by Mr. G. A. Cowie, F.I.C., of 39, Victoria Street, Westminster, London. The best methods of obtaining a heavy yield of roots of high sugar content are discussed and emphasis is laid on the importance of potash both for developing the root and for producing sugar.

Franco-erman Nitrogen Agreement

In connection wit he recent passage by the French Chamber of Deputies by 5 otes to 5 of the draft agreement between France and the I he Anilin und Sodafabrik the following official statement to the German Press by the Badische Co. is not withou :—

The Press is pu g comments on the agreement between the Badische Ani id Sodafabrik and the French Government concerning th stablishment of a factory for the manufacture of nitrogenous products in France. An agreement to that effect was actually passed in 1919 with the assent of the German Government. This agreement dates from the time when the Badische Anilin Works were occupied by French troops and in danger of being forced by France to yield, without comp sation, the privileges they have now bound themselves to e up by mutual agreement.

Newcastle Chemical Club's New Premises

On Monday Dr. H. Peile formally opened the new premises of the Newcastle Chemical Industry Club at Dene House, Ellison Place, Newcastle-on-Tyne. Dr. Peile said the committee must have worked very hard to provide such excellent accommodation. They had already spent £300 on new furnishings, and a library, which would be of great use to chemists, had been provided. Among those present were Dr. F. C. Garrett, Mr. F. Hirsch (chairman), Mr. Arthur Trobridge (hon. secretary and treasurer), Dr. G. Weyman, (hon. librarian), Dr. J. T. Dunn, Mr. H. C. L. Bloxam, Mr. H. Dunford Smith, Dr. P. E. Bowles, Mr. George Sisson, Mr. J. G. Dawson, Mr. Andrew Short and Mr. Duncan.

The vice-presidents of the Club are Sir George Beilby, Sir Charles A. Parsons, Dr. J. E. Stead, Professor H. Louis, Mr. F. Stirling Newall, Dr. F. C. Garrett, and Mr. Herbert Shaw.

Measurement of Hydrogen Ion Concentration

The next meeting of the Birmingham and Midland section of the Society of Chemical Industry will be held under the scheme of co-operation with the Chemical Society in the University Buildings, Edmund Street, Birmingham, on Tuesday, February 20, at 7 p.m., when a paper will be read by Mr. S. R. Carter, M.Sc., A.I.C., on " The Measurement of the Concentration of Hydrogen Ion." The lecture, which will be fully illustrated, will deal with the strength of acids ; a scale of acidity based on the electrolytic solution theory ; definition of the concentration of hydrogen ion, and of the hydrogen potential value P_H ; indicators—their constitution and dependence on P_H values ; buffer solutions ; the P_H values of various solutions ; electrometric determination of P_H ; various types of potentiometers and hydrogen electrodes ; and electrometric titrations.

Recent Wills

Sir Walter Henry Wilkin, of Gloucester Square, Hyde Park, London, yeast merchant	£388,848
Mr. William James Pickford, of Cromer House, The Park, Highgate, London, late of Mincing Lane, chemical manufacturers' agent.....	£26,745
Mr. David Lewis, of Burry Port, Carmarthen, at one time chief laboratory assistant at the Pembrey Copper Works	£1,704
Mr. Frank Edwin Weston, F.I.C., of Sibella Road, Clapham, London, late head of the chemistry department of the Polytechnic, Regent Street, London	£2,356
Mr. William Henry Pratt, of Belmont, Green Lanes, Finsbury Park, London, and of J. J. Pratt and Sons, antimony refiners, Green Street, London	£52,743
Mr. Charles Chetwynd Ellison, of The Hall, Huttons Ambo, Yorks, managing director of the New Monckton Coke and Chemical Co., and on the boards of other companies	£154,907
Mr. Friedrich Wilhelm August Luboldt, of 37, King's Avenue, Muswell Hill, London, a partner in Messrs. Grosscurth and Ludbolt, chemical and drug merchants, 21, Mincing Lane, London	£16,105

From Week to Week

PROFESSOR W. K. VON RÖNTGEN, the discoverer of the x-ray, has died at Munich in his 78th ye

VALUABLE GUANO DEPOSITS are reporte have be n opened up in Madagascar, whence a cargo of ,000 t ns reached this country recently.

A FOURTH FACTORY for the produc logwood dyes has been established in Jamaica. Britis ital, it is stated, is interested in the venture.

NEW COKE OVENS and by-product plant constructed by the Stella Gill Coke and By-Products Co., Ltd., Pelton, will be put into operation next month.

TWENTY-THREE EMPLOYEES of John Richardson and Co. (Leicester), Ltd., manufacturing chemists, have been in the service of the firm for over twenty years.

MR. JAMES HILL HODGES, who had been for many years with Lever Brothers, Ltd., died on February 11, at 24, Oxford Avenue, Bournemouth, in his 74th year.

IT IS with much regret that we have to record the death of Mr. D. Y. Cassels, senior partner in Pott, Cassels and Williamson, Motherwell, which took place suddenly on January 25.

MR. J. B. S. HALDANE has been appointed Sir William Dunn's Reader in Biochemistry at Cambridge University, and Mr. A. Hutchinson as University Lecturer in Crystallography for five years.

ARTHUR J. DICKINSON, LTD., chemical manufacturers and tar distillers, announce the removal of their London offices to 5, Victoria Street, London, S.W.1. The new telephone number is Victoria 2010.

TURKEY AND PERSIA, having expressed their intention of conforming to the provisions of the Hague Opium Convention, will export opium only to countries which issue a certificate that the drug is for legitimate uses.

THE DEUTSCHE PETROLEUM A.G. and the Rütgerswerke, two of the leading firms in the German petroleum and coal-tar trades, are reported to be combining under the name of Deutsche Petroleum und Rütgerswerke.

PROFESSOR J. B. FARMER will be in charge of exhibits of parasitic fungii and insect pests which attack cultivated rubber trees, which are being shown to-day (Saturday) at the Imperial College of Science, London.

MR. ARTHUR CHAMBERLAIN has resigned his offices under Nobel Industries, Ltd., including, amongst others, his seat on the boards or local boards of Nobel Industries, Ltd., Kynoch, Ltd., and the British South African Explosives Co.

NEW WOOD DISTILLATION WORKS have been opened at Mysore, the equipment comprising twelve retorts capable of carbonising 240 tons of wood per day, and a distillation plant producing methyl alcohol, calcium acetate, and wood tar.

THE PRODUCTION of natural phosphates is reported to be increasing in French Morocco. From January 1 to September 30 last their total export reached 45,908 tons. It is thought that by the end of 1923 shipments might reach 150,000 tons.

AS A RESULT of the French action in the Ruhr the export of chemicals, dyestuffs, and chemical manures from that area will be subjected to rigorous conditions. Other articles will be allowed to leave on the payment of a 10 per cent. *ad valorem* duty.

Mr. R. O. SIBLEY, of British Drug Houses, Ltd., Graham Street, City Road, London, secretary of the wholesale druggists' cricket league, invites correspondence from secretaries of clubs with a view to participation in the championship for a silver trophy.

IT IS ANNOUNCED that, before proceeding to this country, the new Viscount Exmouth, who was formerly Professor of Chemistry at Columbia University, will marry Miss Mabel Gray, daughter of a former manager of the Southern Pacific Railway.

A JUNIOR ASSISTANT chemist is required for the Fuel Research Station, East Greenwich, London. Particulars of the appointment are obtainable from the Secretary, Department of Overseas Trade, to whom applications should be sent before February 26.

AT A MEETING of the Chemical Society, to be held on February 22, at 8 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, Principal J. C. Irvine, F.R.S., will deliver a lecture entitled : " Some Constitutional Problems of Carbo-hydrate Chemistry."

A NEW DEFINITION of motor spirit, the flashpoint being 100° F. and the boiling point from 180° to 210° C. was suggested at last week's meeting of the Departmental Committee appointed by the Ministry of Transport on the Taxation and Regulation of Road Vehicles.

IMPROVEMENTS in the factories of the Russian " Phosphotuk " combination are reported to have rendered possible the production of superphosphate, containing from 12 per cent. of water-soluble phosphoric acid, plant for the purpose having been purchased in Germany.

WE REGRET to record the death at 140, Upper Parliament Street, Liverpool, of Mr. Arthur Carey, until recently district manager at Widnes of the United Alkali Co., Ltd., in his 56th year. He was the eldest son of the late Mr. Eustace Carey, who was at one time secretary to the United Alkali Co.

MR. WALTER J. H. LEONARD, manager of Stephenson's Chemical Manure Co., St. Peter's, Newcastle-on-Tyne, has died at 67, Second Avenue, Heaton, Newcastle, at the age of 63. He is survived by his widow and two daughters. The interment took place in Heaton Cemetery on Tuesday.

THE SECRET of producing iridescent mother-of-pearl colouring on celluloid is claimed to have been discovered by Mr. J. W. Dew, who states that a very high silver lustre sheen can be added to any finished celluloid article. He also claims to be able to add iridescent colours to various kinds of celluloid goods.

PROPOSALS for a reduction of wages were discussed at a Conference last week between the Irish Fertiliser Manufacturers' Association and the chemical workers who are members of the Irish Transport Workers' Union. It is understood that a mass meeting of the men will be held further to consider the proposals.

DR. J. NEWTON FRIEND, head of the chemistry department of the Birmingham Municipal Technical School, gave the first of a course of four lectures on " The Colloidal State " at Birmingham on Thursday. The lectures are designed to appeal to science teachers, pharmacists, and those engaged in the paint and varnish industries.

MR. ROSCOE BRUNNER has presented 132 gold and silver watches to employees of Brunner, Mond and Co., Ltd., as rewards for long service. Although the scheme was only inaugurated three years ago, the total awards already amount to 1,754, the periods of service necessary being 35 years for a gold watch and 25 years for a silver one.

RADIUM is now being produced by the Société Generale Metallurgique Belgique of Olen, in practically unlimited quantities at £15 per milligramme. There is nothing new or secret in the process of extraction, the chief factors contributing to the cheapness being stated to be Belgian Congo ore and cheap labour. The output is at present three grammes a month.

SWEDEN'S PRODUCTION OF SULPHITE CELLULOSE in 1922 states the Copenhagen correspondent of the Exchange Telegraph Company, was 600,000 metric tons, while that of sulphate was 200,000 tons. The sulphate output shows a large increase owing to heavy American purchases. America's purchases of Swedish cellulose in 1922 were 400,000 tons, as compared with 200,000 tons bought by England.

A MEETING of the Society of Glass Technology will be held in Armstrong College, Newcastle-upon-Tyne, on February 21, at 2.45 p.m., when the following papers will be read and discussed :—" Organising for Production from Pot Furnaces," by W. W. Warren ; " The Effect of Boric Oxide on the Melting and Working of Glass," by F. W. Hodkin and Professor W. E. S. Turner ; " Some Physical Properties of Boric Oxide-containing Glasses," by Violet Dimbleby, S. English, M.Sc., and Professor W. E. S. Turner.

DR. DUGGAN, OF NEW YORK, who has been on a visit to this country for about two months, left London yesterday (Friday) on his return to the U.S.A. During his stay he has made his headquarters at the Chemical Industry Club, where he has made many friends. On the eve of his departure he stated that he had thoroughly enjoyed his visit, and hoped to contribute some impressions later to THE CHEMICAL AGE. His only complaint was against the weather, for which of late, perhaps, some apology is due to international guests. " Your wretched climate," he said with emphasis, " wants changing ; if only you could get that put right everything here would be excellent."

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German

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REACTIONS.—The reaction between acetylene and aniline at high temperatures. R. Majima, T. Unno and K. Ono. *Ber.*, December 9, 1922, pp. 3854–3859.

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OXIDATION.—The course of oxidation processes. H. Wieland. *Ber.*, December 9, 1922, pp. 3639–3648.

ENZYMES.—Results and aims of general enzyme chemistry. H. v. Euler. *Ber.*, December 9, 1922 pp 3583–3600.

The isolation of enzymes. R. Willstätter. *Ber.*, December 9, 1922, pp. 3601–3623.

ACIDS.—Synthesis of hydro-aromatic acids of the glutaric acid series. A. Windaus, F. Klänhardt and G. Reverey. *Ber.*, December 9, 1922, pp. 3981–3987.

Patent Literature

Abstracts of Complete Specifications

190,995. SULPHUR PROTOCHLORIDE, MANUFACTURE OF. E. Legeler, Premnitz, near Rathenow, Germany. International Convention date, December 29, 1921.

In the usual process for producing sulphur protochloride (S_2Cl_2) by passing chlorine over sulphur, the chloride usually contains sulphur and chlorination products of lower boiling point. In the present process, a quantitative yield of sulphur protochloride is obtained by passing chlorine into a boiler containing molten sulphur, connected with a condenser and placed under vacuum. The sulphur may be mixed with a chlorine carrier such as iron, iron chloride, or iodine, and the sulphur chloride is continuously distilled off and condensed.

191,415. CARBONACEOUS AND SIMILAR MATERIALS, TREATING FOR THE UTILISATION OF THE CONTAINED NITROGEN. E. L. Pease, Hurworth Moor, Darlington. Application date, July 12, 1921.

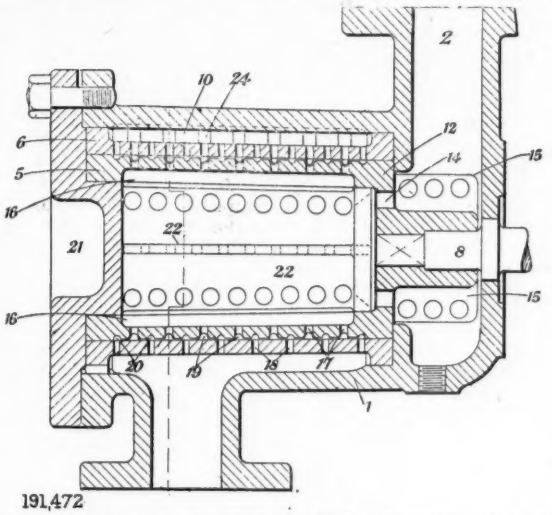
The object is to obtain ammonia salts and dry nitrogenous fertilisers from substances such as peat. The peat is mixed with phosphoric acid and sufficient water to obtain an intimate mixture, which is then slowly heated to about 200° C. Part of the nitrogen is thereby converted into a water-soluble ammonium salt, and the water content of the peat is removed. Sulphuric acid may also be used, but the temperature must be controlled so that the sulphuric acid is not decomposed by the carbonaceous matter of the peat. The reaction is effected in a closed vessel under a moderate pressure, and the phosphoric acid is preferably present in excess. Any surplus acid may combine with lime which may be present, the calcium phosphate produced being also valuable as a fertiliser. The process is also applicable for treating coal, shale, and other material containing nitrogen, but a porous material such as peat is more suitable.

191,417. RESINOUS PRODUCTS OF CONDENSATION FROM PHENOL AND FORMALDEHYDE, PROCESS FOR THE MANUFACTURE OF. C. Kulas, 87, Weststrasse, Leipzig and C. Pauling, 24, Luppenstrasse, Leipzig-Lindenau, Germany. Application date, August 8, 1921.

Specification No. 159,494 (see THE CHEMICAL AGE, Vol. IV, p. 566) describes a process for producing phenol-formaldehyde resins in two stages. In the first stage a liquid resin is obtained which reacts with a further quantity of phenol-formaldehyde to obtain the final product, which may either be soluble and fusible, or insoluble and infusible. The usual methods for converting the fusible resins into infusible resins by combined heat and pressure have the disadvantage that the condensation process tends to continue during the hardening process, so that non-uniform products are obtained. In the present process, the resin is mixed with a liquid capable of increasing its elasticity, such as a mixture of amyl alcohol, glycerine and/or camphor oil. The mixture is boiled to expel the water, and glacial acetic acid is added. The product is hardened by heating on a water bath or in a drying chamber at 90°–100° C. The product is more elastic and may be more easily worked than the usual phenol-formaldehyde products.

191,472. EMULSIONS, PRODUCTION OF. W. Douglas & Sons, Ltd., and J. S. Nicol, Douglas Wharf, Putney, London, S.W.15. Application date, October 12, 1921.

The apparatus is more particularly for producing emulsions of oil and water. A casing 1 contains two hollow concentric cylinders 5, 6, the inner cylinder 5 being mounted on a rotating shaft 8. An annular space 10 is provided between the casing 1 and cylinder 6, and a narrow space between the cylinders 5, 6. The end wall 12 of the cylinder 5 is provided with openings 14, and with perforated radial paddles 15, while radial ribs 16 project inwards from the cylinder 5. Both cylinders are perforated at 17, 18, the perforations being out of line, and relatively deep circumferential grooves 19 are formed on the periphery of the inner cylinder. This cylinder also contains narrow grooves 20 opposite the perforations 18. The end cover 21 is provided with fixed radial baffles 22 extending into the cylinder 5, and perforated as shown. The space 10 contains a number of radial pins 24 which project through the cylinder 6 into the grooves 19. The mixture of liquids is admitted at the inlet 2 and is subjected to preliminary agitation by the action of the paddles 15. The mixture then passes through the openings 14 into the cylinder 5, and is subjected to intensive disintegration in the tortuous passages between the two cylinders. The diameter of the inner cylinder may be

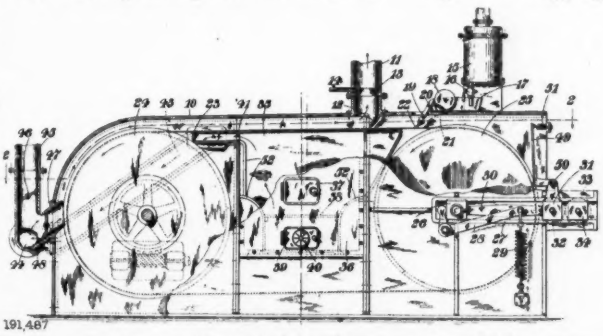


191,472

about 6 inches, the other parts being in proportion, while the space between the two cylinders is about 0·004 inch and the speed is about 1,000–1,200 revolutions per minute.

191,487. LATEX, APPARATUS FOR THE TREATMENT OF. Sir H. A. Wickham, and Roa, Ltd., 9–11, Fenchurch Avenue, London, E.C.3. Application date, October 14, 1921.

The latex is delivered from a vessel 15 into a shallow pan 17 having a rotating roller 18 partly immersed in it. The roller picks up a film of latex, which is removed by the upper edge of an inclined shoot 19 resting on it. The lower edge 22 of the shoot is pivoted and rests on the travelling band 23, on which the latex is treated. The band 23 is preferably of steel, and passes over two drums 24, 25, journalled in the side walls of the casing 10. The spindle of the drum 25 is mounted in blocks 26 which slide in guides 27, and the band 23 is maintained in tension by means of a lever 28 and spring 29, which press against the blocks 26. A pair of stripping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rollers 32, 33, are journalled in blocks 31, 34, which are connected by links 30 to the blocks 26. The smoke-producing furnace 35 is arranged between the upper and lower parts of the band 23, and within the casing 10 and its detachable front wall is provided with a fire-door 37. The smoke passes out through the passage 41 to a hollow T-piece 42 discharging on both sides into the flues 43, which deliver through a common flue 44. The quantity of smoke passing into the chamber 10 and to the uptake 45 is regulated by dampers 48, 46. The smoke is thus discharged directly against the film of latex, and the coagulated latex is removed at the other end of the casing by means of the scraper 49. The temperature within the casing is preferably 300° F., and for a sample of latex

containing 70 per cent. of water the speed of the band 23 should be such that the time taken for the latex to travel from the inlet shoot 19 to the smoke flue 47 is about 30 seconds. (Compare also the apparatus described in specification 177,262. See THE CHEMICAL AGE, Vol. VI., p. 562.)

191,582. ALUMINIUM CHLORIDE, RECOVERY OF. R. Haddan. From Gulf Refining Co., Port Arthur, Tex., U.S.A. Application date, December 12, 1921.

The object is to recover aluminium chloride from the residues obtained in the treatment of oils with aluminium chloride. The residue is heated to a temperature sufficient to break up the aluminium chloride compound without the use of chlorine, and the volatilised aluminium chloride is condensed. The remainder of the aluminium chloride in the residue is then recovered by passing chlorine or hydrochloric acid gas through it. The residue is first heated to a temperature sufficient to distil off the free hydrocarbon oils, and then to a temperature of about 1,450° F., which releases about 50 per cent. of the combined aluminium chloride. Chlorine or hydrochloric acid gas is given off during the heating, and may be recovered by adding 2–3 per cent. of metallic aluminium or aluminium carbide or sulphide. It is found that about 50 per cent. of the aluminium chloride may be recovered by the heat treatment, or about 72 per cent. when metallic aluminium is added. The whole of the remainder of the aluminium chloride is recovered by passing chlorine or hydrochloric acid gas through the residue. The aluminium chloride is recovered in a pure anhydrous form, and is free from any iron compounds which it may contain as a result of its use in iron stills.

191,687. TREATING CERTAIN WASTE LIQUORS AND OBTAINING VALUABLE PRODUCTS THEREFROM. The Silver Springs Bleaching and Dyeing Co., Ltd., and A. J. Hall, Timberbrook, Congleton, Cheshire. Application date, July 21, 1922.

The process is for obtaining a ferro-cyanide of an alkali or alkaline earth metal from the waste liquors obtained in prussiate aniline black dyeing. Specification No. 188,208 (see THE CHEMICAL AGE, Vol. VII, p. 829) describes the production of a blue cyanogen compound from this liquor, and the present process is an extension of this. The waste liquor obtained by after-chroming and washing aniline black dyed fabric after it has been aged or steamed is treated with ferrous sulphate, and the blue precipitate filtered in a filter press. The blue precipitate is suspended in water and boiled with an alkali or alkaline earth such as sodium carbonate, caustic soda, potassium carbonate, caustic potash or ammonia, to decompose the cyanogen compound. The solution is filtered and then concentrated to 50–60° Tw. and allowed to crystallise, yielding pure potassium, sodium or ammonium ferrocyanide.

191,630 and 191,692. PHOSPHORIC ACID AND FERRO-PHOSPHORUS, PRODUCTION OF. H. G. C. Fairweather, London. From Federal Phosphorus Co., Anniston, Alabama, U.S.A. Application date, February 1, 1922.

The process is for treating a mixture of phosphatic material, iron, carbon, and siliceous flux, in an electric furnace. Part of the phosphorus is evolved with the furnace gases, and part combines with the iron. Free phosphorus is liberated with the furnace gases, and may be condensed as such in the absence of air, the residual gas consisting mainly of carbon monoxide. Alternatively, air may be admitted to oxidise the carbon monoxide to carbon dioxide, and the phosphorus to phosphorus pentoxide. The latter absorbs moisture from the gases to an amount which depends on the temperature; if the temperature decreases, meta-, pyro-, and ortho-phosphoric acid are formed in succession. The temperature of the gases is regulated by internal or external water or air cooling, and the oxidation is controlled as the result of analysis of the gases. The gases containing suspended phosphoric acid are passed through an electric precipitator to obtain a concentrated acid, or a scrubbing tower to obtain a dilute acid. It is found that when the gases are cooled to 350° C. meta-phosphoric acid is produced by absorption of water, pyro-phosphoric acid is produced at 215° C., and ortho-phosphoric acid at 120°–210° C. A further reduction of temperature to 70–120° C. causes a further absorption of water, yielding a dilute acid of 70–80 per cent. The necessary water is obtained from the atmosphere, from the charge of raw material, or from internal cooling water. An excess of moisture does not affect the product, since the amount absorbed depends on the temperature. The phosphoric acid produced is of high purity, and is suitable for medicinal and food purposes. An apparatus is described in which the gases from the electric furnace pass through an outlet pipe subjected to a cooling spray, and are then passed by a fan to an electric precipitator. A suitable charge of raw material consists of crushed phosphate rock containing 14 per cent. of phosphorus 500 parts, sand 135 parts, coke 95 parts, and cast iron borings 200 parts. The ferro-phosphorus is withdrawn with the slag from the bottom of the furnace.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 171,367 (M. Melamid) relating to production of hydrocarbons of relatively low boiling point from tar oils, see Vol. VI, p. 48; 185,757 (Farbenfabriken vorm. F. Bayer & Co.) relating to a process of absorbing ethylene and its homologues, see Vol. VII, p. 654; 187,231 (Chemische Fabrik in Billwarder vorm. Heil & Sthamer Akt.-Ges.) relating to chrome alum, see Vol. VII, p. 942.

International Specifications not yet Accepted

190,119. PURIFYING GASES. Koppers Co., 800, Union Arcade Building, Pittsburg, U.S.A. (Assignees of J. A. Shaw, 600, Union Arcade Building, Pittsburg, U.S.A.) International Convention date, December 8, 1921.

Coke oven gas is treated with an alkali, such as sodium carbonate, to absorb sulphuretted hydrogen, hydrocyanic acid, etc. The sodium carbonate solution and the gas pass in counter-current through a scrubber, and the liquor is then sprayed on to ferric oxide spread over a filtering bed. The iron oxide absorbs the sulphur from the alkali solution, and it may be revivified by passing air through it. The regenerated alkali solution is then returned to the scrubber.

190,131. PURIFYING GASES. Koppers Co., 800, Union Arcade Building, Pittsburg, U.S.A. (Assignees of C. J. Ramsburg, Sewickley, Pa., U.S.A.) International Convention date, December 8, 1921.

The process is for purifying coke oven gases from sulphuretted hydrogen, hydrocyanic acid, carbon dioxide, etc., by treatment with an alkali solution such as sodium carbonate. The gas is treated with the alkali in a scrubber, and the liquor is then transferred to an agitator, together with hydrated iron oxide or basic ferric carbonate. The alkali is regenerated and iron sulphide is formed, and the mixture is passed to a continuous separator. The alkali is recovered by passing through a filter, and is returned to the scrubber. The iron sulphide sludge is treated with air, which converts it into a mixture of iron oxide and sulphur, which is returned to the agitator. The sulphur is separated from the iron oxide at intervals.

190,157. FINELY DIVIDED SOLID SUBSTANCES SUCH AS LEAD OXIDE, PRODUCTION OF. E. Goldschmidt Akt.-Ges., L. Schertel and W. Luty, 18, Salkenbergsweg, Essen, Germany. International Convention date, December 8, 1921.

Solid substances are obtained in a finely divided condition by volatilising the raw materials during their passage over bodies of large superficial area. The relative movement between the bodies of large area and the raw materials may be obtained by means of perforated discs which lift the raw material and allow it to fall, or the raw materials may be passed downwards through a shaft containing porous refractory materials. This operation is conducted at a temperature sufficient to effect volatilisation, in the presence of a reacting gas if necessary. In an example, litharge or molten lead passes downwards through a shaft containing refractory materials, such as magnesite, clinker, or chrome iron ore.

190,500. ELECTROLYSIS. P. A. Govaerts, 193, Chaussee de Watermael, Avderghen, Brussels, and P. M. Wenmaeckers, 73, Rue Georges Moreau, Cureghem, Brussels. International Convention date, December 19, 1921.

Metals may be electrolytically deposited on aluminium from a solution of a double thiosulphate of the metal. An iron electrolyte consists of ferrous sulphate added to a solution of sodium thiosulphate acidified with acetic acid. A copper electrolyte is prepared by treating an acidified concentrated solution of copper sulphate with sodium thiosulphate solution. The precipitate produced is washed, and dried rapidly *in vacuo*,

(*Continued on page* 183.)

(*Continued from page* 182)

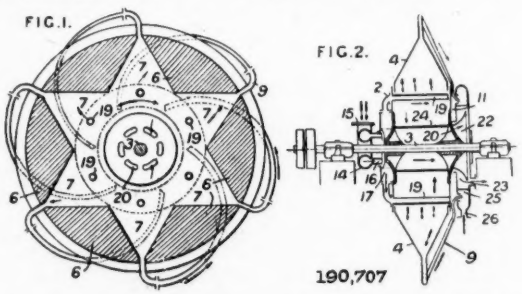
and then dissolved in warm sodium thiosulphate solution. A copper-silver alloy may be deposited by adding a silver electrolyte obtained in a similar manner. Brass may be deposited by adding to the copper electrolyte a mixture of zinc sulphate and sodium thiosulphate which has been heated and then cooled. The anode used is the same as the metal to be deposited.

190,694. CELLULOSE ESTER SOLUTIONS. Nitrogen Corporation, 55, Canal Street, Providence, R.I., U.S.A. (Assignees of J. C. Clancy, Providence R.I., U.S.A.) International Convention date, December 23, 1921.

Cellulose esters are treated with anhydrous liquid ammonia in sufficient quantity to form a solution, or only a gelatinous mass. This mixture may be added to a liquid in which the cellulose ester is not initially soluble, to obtain a solution in that liquid. The ammonia is then evaporated off. The process may be used for obtaining solutions in aliphatic or aromatic alcohols alone or mixed with esters of the alcohols, carbon tetrachloride, chloroform, monochlorethane, tetrachlorethane, benzene, or naphthalene.

190,707. CENTRIFUGAL SEPARATORS. Soc. Générale d'Evaporation Procédés Prache et Bouillon, 25, Rue de la Pépinière, Paris. International Convention date, December 20, 1921.

Two end discs 2 are connected by conical frustra 4, and the tapering space within the frustra contains a number of equally-spaced filling blocks of such shape that a number of radial



spaces of pyramid shape are formed. Each space is connected by a tube 9 at its apex, to a collecting ring 25. Openings 20 are provided in the end disc, leading to a collector 22 having a separate discharge 23. The liquid to be treated is supplied through the inlet 15 and nozzles 16 to the space 17, and then passes through perforated tubes 19. Solids and thick liquids pass to the periphery, and the liquid passes through the tubes 9 to the discharge 26. Separated clarified liquid passes inwards through perforations 24 to the outlet 23.

190,723. CRACKING HYDROCARBON OILS. A. A. F. M. Seigle, 3*bis*, Rue Clement Marot, Paris. International Convention date, December 22, 1921.

Petroleum, peat, shale, or lignite oils, heavy tars, resin oils, naphthalene oils, etc., are fed through a preheater to the lower end of a vertical annular retort. The retort is heated by a flame projected downwards through the central space, to a temperature of 550°–650° C, and the vapour passes upwards through the annular space in contact with catalytic material such as copper, iron, aluminium, nickel, etc. The vapour passes to two condensers in series which are cooled by jackets containing water or calcium chloride solution to 250°–300° C. and 180° C. respectively. The remaining vapour passes to a water-cooled condenser and a scrubber. The combustion gases from the retort are passed through the preheater, and air may be admitted to the retort at different levels to regulate the temperature.

LATEST NOTIFICATION.

192,703. Process for the manufacture of urea from cyanamide. Soc. d'Etudes Chimiques pour l'Industrie. February 4, 1922.

Specifications Accepted, with Date of Application

169,458. Separating suspended particles from vapours and gases, Apparatus for. J. Gray. (*Deutsche Luftfilter Bauges*). September 23, 1921.

174,574. Low boiling point saturated hydrocarbons from heavy hydrocarbon oils, Production of. Chemical Research Syndicate, Ltd. January 28, 1921.

177,761. Aqueous liquids, Process for purifying. Soc. Ricard Allenet et Cie. March 26, 1921. Addition to 173,735.

181,719. Prussian blue, Process for making—starting from coal gas. A. Dessemond and A. H. Delclève. June 16, 1921.

186,312. Cleaning the bowls of centrifugal separators and parts thereof. Aktiebolaget Separator. September 22, 1921.

187,195. Lead compounds, Recovery of. A. Nathansohn. October 13, 1921.

192,106. Aluminium chloride used in the conversion of high boiling point hydrocarbons into low boiling point hydrocarbons, Process of recovering. E. C. R. Marks. (*Hoover Co.*) August 22, 1921.

192,173. Cellulose derivatives, Production of. Burgess, Ledward and Co., Ltd., and W. Harrison. October 29, 1921.

192,278. Hydration of lime and like reactions. N. V. S. Knibbs and Denny Chemical Engineering Co., Ltd. January, 30, 1922.

192,298. Papaverine nitrite, Process for the preparation of. C. H. Boeharinger Sohn, and H. Stenzl. February 21, 1922.

192,335. Fertilisers. L. D. Pocock. May 18, 1922.

Applications for Patents

Appareils et Evaporateurs Kestner. Apparatus for distilling water. 3,388. February 5. (Belgium, December 16, 1922.)

Ashcroft, E. A. Apparatus for electrolysing fused salts of metal, recovering the metals and acid radicles, etc. 3,789. February 8.

Blattner, R. H. D. (*Grouchkine*). Process for working up mineral sodium carbonate. 3,709. February 7.

British Alizarine Co., Ltd. Discharging-agents, and processes employing same. 3,597. February 7.

British Dyestuffs Corporation, Ltd., Clemo, G. R., and Perkin, W. H. Manufacture of bodies related to the acridines. 3,584. February 6.

Cocksedge, H. E. (Sundström, C., and Tirziev, G. N., partly). Manufacture of a sodium compound. 3,476. February 6.

Coley, H. E., and Hornsey, J. W. Concentration of iron ores. 3,346. February 5.

Coley, H. E., and Hornsey, J. W. Method of sealing rotary kilns, etc. 3,347. February 5.

Coley, H. E., and Hornsey, J. W. Manufacture of iron from iron ores. 3,348. February 5.

Demoulins, H. D., and Garner, F. H. Purification of hydrocarbons. 3,687. February 7.

Drescher, H. A. E., and Scottish Dyes, Ltd. Production of anthraquinone bodies. 3,828. February 8.

Koppers Co. Removal of hydrogen sulphide, etc., from gases. 3,546. February 6. (United States, January 24.)

Nangatuck Chemical Co. Vulcanisation of rubber, etc. 3,544. February 6. (United States, July 13, 1922.)

Nobel, L. A. Production of ferro-chromium alloys. 3,402. February 5.

Plauson's (Parent Co.), Ltd., and Schotz, S. P. Manufacture of emulsions of oleic acid, etc. 3,488. February 6.

Silica Gel Corporation. Manufacture of gels. 3,938. February 9.

Soc. Chimique de la Grande-Paroisse (Azote et Produits Chimiques) and Claude, G. Production of a nitrogen-hydrogen mixture for synthetic manufacture of ammonia. 3,697. February 7.

Technical Research Works, Ltd. Method of activating, etc., metallic catalysts. 3,932. February 9.

Applications for Dye Import Licenses

THE following statement relating to applications made during January, 1923, for licences under the Dyestuffs (Import Regulation) Act, 1920, has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee. Similar monthly statements will be issued regularly in future. The total number of applications received was 562, of which 473 were from merchants and agents. These were dealt with as follows :—

Granted	359	(of which 340 were dealt with within one week).
Refused, applicants being referred to British makers (British equivalents being available)	94	(of which 93 were dealt with within one week).
Referred to Reparation Supplies	53	(of which 53 were dealt with within one week).
Outstanding on January 31..	56	(most of these were applications received on January 31, and 38 were dealt with on February 1).

Of the total number, 562, of applications received, 412, or 73 per cent., were dealt with within two days.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, February 15, 1923.

MOST chemicals are in good demand, and price movements are upwards almost without exception. The situation in Germany becomes increasingly serious, and the opinion is developing that supplies from that market are likely to be severely restricted.

Export demand is active, particularly for those articles usually purchased from the Continent.

General Chemicals

ACETONE is in good demand and is scarce in all positions Continental supplies are dwindling and the situation remains very firm.

ACID ACETIC has hardened in price. Spot supplies are very short.

ACID CITRIC becomes more active as the year goes on. Buyers are inclined to negotiate.

ACID FORMIC is fairly active. Price unchanged.

ACID LACTIC.—Unchanged.

ACID OXALIC is in fair demand and is inclined to be firmer in price.

ARSENIC.—There is nothing new to report. Makers are sold ahead and any spot supplies are eagerly snapped up.

BARIUM CHLORIDE remains very cheap, and an improvement in value is not unlikely.

FORMALDEHYDE is distinctly dearer and the upward tendency continues.

LEAD ACETATE is in good demand and improving in value.

METHYL ALCOHOL is practically unobtainable.

POTASSIUM CARBONATE is weak and favours buyers.

POTASSIUM CAUSTIC is practically without a market.

POTASSIUM PERMANGANATE is very firm indeed and supplies are short.

POTASSIUM PRUSSIATE.—Unchanged in price, but a firm market.

SODA ACETATE.—Demand is still rather slow, but intrinsically the article is cheap, having regard to the general market position.

SODA HYPOSULPHITE.—Unchanged.

SODA NITRITE is without special feature.

SODA PRUSSIATE has been in rather better demand and an improvement in export inquiry is likely at once to affect the price.

ZINC OXIDE.—Substantial business is passing and the article is very firm indeed.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID has continued in steady demand at last prices. The market is very firm and should advance in view of the present cost of raw materials.

ACID SALICYLIC is advancing. Second-hand parcels are becoming scarce. Makers are gradually raising the price of carbolic acid which is reflected in salicylic.

AMIDOPYRIN has declined slightly. There has been considerable inquiry for export.

BROMIDES have been in fair demand at last prices.

METOL.—Forced realisation of an import parcel has had a somewhat unsettled effect. Prices should recover later, as present values are not remunerative to manufacturers.

PHENAZONE.—Export demand has been brisk and makers are fully sold for early delivery.

VANILLIN is in good demand and inclined to be firmer.

Coal Tar Intermediates

This market has been more interesting during the past week and a number of articles show an upward tendency.

ALPHA NAPHTHOL continues in demand and stocks are not heavy.

ALPHA NAPHTHYLAMINE has been a little more interesting.

ANILINE OIL AND SALT continue to pass steadily into consumption.

BENZALDEHYDE is the turn easier.

BENZIDINE BASE has been inquired for.

BETA NAPHTHOL has been a fair business and moderate inquiry continues to be received.

BETA NAPHTHYLAMINE is in demand.

DIMETHYLANILINE.—Some fair orders have been booked.

DIPHENYLAMINE has been required and a rise in price is looked for before long.

"H" ACID has been a fair business at recent quotations.

NITRO NAPHTHALENE.—Some home orders have been booked.

NAPHTHIONIC ACID is without special feature.

PARANITRANILINE is slightly easier.

RESORCIN is firm.

XYLIDINE.—Some export orders have been received.

Coal Tar Products

The firm tone of the market is maintained, with a good demand, the supply of many Coal Tar Products being short.

90's BENZOL is steady at 1s. 7½d. to 1s. 8d. per gallon on rails in the Midlands.

PURE BENZOL has a poor demand, and is worth 2s. per gallon in the North, and 2s. 4d. to 2s. 6d. per gallon in the South.

CREOSOTE OIL is scarce, and the price maintains its upward tendency. It is worth about 8½d. to 8¾d. per gallon in the Midlands and North, and about 9d. to 9¼d. per gallon in the South.

CRESYLIC ACID is uninteresting, and is worth about 2s. on rails for the Pale quality 97/99%, and 1s. 9d. per gallon for the Dark quality 95/97%.

SOLVENT NAPHTHA is quiet for prompt delivery, and is worth about 1s. 6d. per gallon in the North, and 1s. 10d. to 2s. per gallon in London.

HEAVY NAPHTHA has a poor sale, and the price remains unchanged.

NAPHTHALENE is in good demand, the crude qualities being worth from £6 to £10 per ton.

PITCH remains firm, and prices are still advancing. To-day's quotations are 165s. to 167s. 6d. f.o.b. London, 165s. f.o.b. East Coast, and 162s. to 165s. f.o.b. West Coast.

Sulphate of Ammonia

The position is unchanged, and there is a satisfactory demand for home trade.

Current Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	4	to	0	1	6
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	130	0	0	to	135	0	0
Acid, Acetic, glacial, 99–100%	ton	69	0	0	to	70	0	0
Acetic, 80% pure	ton	45	0	0	to	46	0	0
Arsenic, liquid, 2000 s.g.	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	55	0	0	to	60	0	0
Carbolic, cryst. 39–40%	lb.	0	0	8¾	to	0	0	9
Citric	lb.	0	1	9	to	0	1	10
Formic, 80%	ton	50	0	0	to	51	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	29	0	0
Oxalic	lb.	0	0	7	to	0	0	7½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	2	to	0	1	4
Sulphuric, 92–93%	ton	6	10	0	to	7	10	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	2½	to	0	1	3
Alum, lump	ton	11	10	0	to	11	15	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	0	0
Aluminium, sulphate, 17–18%	ton	9	10	0	to	10	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8

	Per	£	s.	d.		£	s.	d.
Ammonia, .880	ton	32	0	0	to	34	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	50	0	0	to	55	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	65	0	0	to	68	0	0
Ammonia, sulphocyanide, com'l, 90%	lb.	0	1	1	to	0	1	3
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	70	0	0	to	75	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Barium carbonate, Precip.	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	15	0	0	to	15	15	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	1
Bleaching powder, 35–37%	ton	10	10	0	to	11	0	0
Borax crystals	ton	28	0	0	to	32	0	0
Calcium acetate, Brown	ton	12	10	0	to	13	10	0
,, ,, Grey	ton	17	10	0	to	18	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to	7	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	98	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	27	10	0	to	28	10	0
Cream Tartar, 98–100%	ton	92	10	0	to	95	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	90	0	0	to	95	0	0
Formusol (Rongalite)	lb.	0	2	2	to	0	2	3
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerin, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	3	to	0	2	4
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	41	0	0	to	43	0	0
Carbonate (White Lead)	ton	45	0	0	to	48	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	22	10	0	to	23	10	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	6	10	0	to	7	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	58	0	0	to	60	0	0
Methyl acetone	ton	62	0	0	to	63	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	45	0	0	to	46	0	0
Ammonium sulphate, double salt	ton	45	0	0	to	46	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	6	to	0	0	6½
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	10	0	to	10	10	0
Chlorate	lb.	0	0	4½	to	0	0	4½
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	9	to	0	0	9½
Prussiate, red	lb.	0	4	3	to	0	4	6
Prussiate, yellow	lb	0	1	6½	to	0	1	7½
Sulphate, 90%	ton	12	10	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	40	0	0	to	42	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4½
Bisulphite 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	3½
Caustic, 70%	ton	19	10	0	to	20	0	0
Caustic, 76%	ton	20	10	0	to	21	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	28	0	0	to	29	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	10	to	0	0	10½
Prussiate	lb.	0	0	10½	to	0	0	11
Sulphide, crystals	ton	10	10	0	to	11	0	0
Sulphide, solid, 60–62%	ton	16	10	0	to	17	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	40	0	0	to	42	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	11	10	0	to	12	10	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	3	to	0	1	4
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	40	0	0	to	42	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	10	0	to	17	10	0

Pharmaceutical Chemicals

		£	s.	d.		£	s.	d.
Acetyl salicylic acid	lb.	0	2	10	to	0	3	0
Acetanilid	lb.	0	1	4	to	0	1	6
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	6	to	0	1	9
Tannic, leviss	lb.	0	3	4	to	0	3	6
Amidol	lb.	0	8	6	to	0	8	9
Amidopyrin	lb.	0	13	6	to	0	14	0
Ammon ichthosulphonate	lb.	0	2	0	to	0	2	3
Barbitone	lb.	0	12	6	to	0	13	6
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	7½	to	0	0	8
Potash	lb.	0	0	6½	to	0	0	7
Soda	lb.	0	0	7	to	0	0	7½
Caffeine, pure	lb.	0	12	0	to	0	12	3
Calcium glycerophosphate	lb.	0	5	6	to	0	6	0
Calcium lactate	lb.	0	2	0	to	0	2	3
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	4	3	to	0	4	6
Cocaine alkaloid	oz.	0	18	6	to	0	19	0
Cocain hydrochloride	oz.	0	15	0	to	0	15	6
Corrosive sublimate	lb.	0	4	3	to	0	4	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	7	to	0	1	7½
B.P. (75–80% eucalyptol)	lb.	0	1	8	to	0	1	8½
Guaiacol carbonate	lb.	0	8	0	to	0	8	3
Liquid	lb.	0	9	0	to	0	9	6
Pure crystals	lb.	0	10	0	to	0	10	6
Hexamine	lb.	0	3	9	to	0	4	0
Hydroquinone	lb.	0	3	0	to	0	3	3
Lanoline anhydrous	lb.	0	0	7½	to	0	0	8
Lecithin ex ovo	lb.	0	18	6	to	1	0	0
Lithia carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	2	to	0	2	6
Metol	b.	0	10	0	to	0	10	6
Milk sugar	cwt.	4	17	6	to	5	2	6
Paraldehyde	lb.	0	1	5	to	0	1	6
Phenacetin	lb.	0	5	0	to	0	5	3
Phenazone	lb.	0	6	6	to	0	6	9
Phenolphthalein	lb.	0	5	0	to	0	5	3
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3			—	
Resorcine, medicinal	lb.	0	5	3	to	0	5	6
Salicylate of soda powder	lb.	0	2	0	to	0	2	3
Crystals	lb.	0	2	1	to	0	2	4
Salol	lb.	0	2	3	to	0	2	6
Soda Benzoate	lb.	0	2	0	to	0	2	3
Sulphonal	lb.	0	13	6	to	0	14	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	6
,, soda salicylate	lb.	0	8	0	to	0	8	6
Vanillin	lb.	1	2	6	to	1	3	6

Coal Tar Intermediates, &c.

		£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Alphanaphthol, refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9½	to	0	0	10
Aniline salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	0	to	0	3	3
Benzidine, base	lb.	0	5	0	to	0	5	3
Benzidine, sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	2½	to	0	1	3
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0

	Per	£	s.	d.		£	s.	d.
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	7	to	0	1	9
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	3	9	to	0	4	0
H-Acid	lb.	0	5	0	to	0	5	3
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	8	to	0	0	8½
Nitronaphthalene	lb.	0	1	0	to	0	1	1
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Para-amidophenol, hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	0	to	0	3	3
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	11	6	to	0	11	9
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	weak, c.i.f. 1/10 spot	0	2	0
Bay		0	11	0
Bergamot	firm	0	12	0
Cajuput		0	3	9
Camphor, white	per cwt.	4	2	6
Camphor, brown	easier, per cwt.	3	15	0
Cassia	c.i.f. 7/3 spot	0	8	3
Cedarwood		0	1	6
Citronella (Ceylon)	quiet but very firm	0	3	3
Citronella (Java)	quiet but very firm	0	3	6
Clove		0	7	0
Eucalyptus		0	1	6
Geranium Bourbon		1	4	0
Lavender		0	12	0
Lavender spike		0	3	3
Lemon	firm	0	2	11
Lemongrass	per oz.	0	0	2½
Lime (distilled)		0	3	0
Orange sweet (Sicilian)		0	9	0
Orange sweet (West Indian)		0	8	6
Palmarosa	firmer	0	17	6
Peppermint (American)		0	13	6
Mint (dementholised Japanese)	easier	0	7	0
Patchouli		1	14	0
Otto of Rose	per oz.	1	4	0
Rosemary		0	1	8
Sandalwood		1	6	0
Sassafras	easier	0	5	0
Thyme	easier, according to quality 2/4 to	0	6	0
Synthetics.				
Benzyl acetate	firm	0	3	0
Benzyl benzoate	firm	0	3	0
Citral		0	10	6
Coumarine		0	12	0
Heliotropine		0	5	6
Ionone		1	7	0
Linalyl acetate	easier	1	2	6
Methyl salicylate	firm	0	2	0
Musk xylol		0	8	6
Terpeniol	firm	0	3	0

The Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 15, 1923.

Chemical traders here have met with a fair demand for many of the principal items, though transactions have, individually, been of smaller volume than is normally the case, buyers apparently still pursuing a cautious policy. Continental buying has been very restricted, most of the export business being confined to the Dominions. Home consumption in the iron and steel and paper-making industries is on a fairly satisfactory scale. Prices all round are well maintained.

Heavy Chemicals

Caustic soda is being taken up steadily both on home and foreign account at £19 per ton for 60–68 per cent., and £21 10s. for 76–77 per cent. strength. Bleaching powder is also in good request for both branches of trade at £11 10s. per ton. Soda crystals are firm at £5 10s. per ton delivered, a moderate demand from home consumers being met with. Saltcake keeps fairly active for shipment, with, however, only a quiet demand from the home trade; quotations are steady at £4 10s. per ton for the latter and about 20s. more for export. Sodium sulphide, 60–65 per cent. concentrated, has improved a little at £16 per ton, with crystals on offer at £10. Glauber salts are quoted at £4 10s. per ton, with only a moderate amount of business being done. Bicarbonate of soda is firm and in better inquiry at £10 10s. per ton, delivered to home consumers. Alkali is in good demand for the home trade and also for export at £7 12s. 6d. per ton for 58 per cent. material. Hyposulphite of soda is quiet at £16 per ton for photographic crystals and £10 for commercial. Nitrate of soda is also rather inactive, though £28 per ton is still asked. Phosphate of soda is in irregular demand at £16 per ton. Chlorate of soda is firmer at 3d. per lb., holders meeting with a steady inquiry. Prussiate of soda keeps quiet at 9¾d. per lb. Bichromate of soda is steady at 4½d. per lb., the demand still being good. Acetate of soda is again firmer at £23 15s. per ton on continued steady sales.

Potashes firmer

Caustic potash is in improved demand, and £29 per ton is now asked for 88–90 per cent. strength. Carbonate of potash is firmer at £25 10s. for 90 per cent. material. Bichromate of potash is steady and in good inquiry at 6d. per lb. Yellow prussiate of potash is firm at 1s. 5½d. per lb., but the demand is still rather quiet. Chlorate of potash is selling in satisfactory quantities and is now quoted at 3¼d. to 3½d. per lb. Permanganate of potash keeps firm at 8d. per lb., the improvement in this material being maintained.

The home demand for sulphate of copper has expanded a little, and good business is still being put through on export account; quotations are firm at £26 10s. per ton. Arsenic keeps scarce for prompt parcels for shipment, and £75 per ton for white powdered, Cornish makes, is generally asked. Commercial Epsom salts are selling rather better at about £5 10s. per ton, with magnesium sulphate, B.P., unchanged at £8. Grey acetate of lime has further advanced to £19 10s., supplies being short; brown is quoted at £9 10s. to £10. Nitrate of lead is steady at £42 per ton, though little improvement can be reported. White sugar of lead is in good demand at £40 per ton; brown is scarce and firmer at £38.

Acids and Tar Products

Tartaric acid is fairly active at 1s. 2½d. per lb. Citric acid, B.P. crystals, is in moderate request at 1s. 8¼d. Acetic acid is very firm at £67 for glacial and £43 10s. per ton for 80 per cent. technical, supplies going readily into consumption. Oxalic acid keeps dull at 6¾d. to 7d. per lb.

Up to £7 10s. per ton, f.o.b. Manchester, is now quoted for parcels of pitch for prompt shipment, the export demand, largely to the Continent, being very strong. Carbolic acid crystals are again higher on continued steady buying at 9½d. to 9¾d. per lb.; crude, 60 per cent. material, is very firm at about 2s. 9d. per gallon. Benzole is quiet but steady at 1s. 8d. per gallon. Solvent naphtha is dull at 1s. 8d. to 1s. 9d. per gallon. Creosote oil is in very good demand at 8¼d. to 8½d. per gallon. The improvement in naphthalenes keeps up, and prices are very firm at £16 10s. per ton for refined sorts and up to £9 per ton for crude.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, February 14, 1923.

BUSINESS during the past week has been quiet, with only a fair number of inquiries received.

Continental quotations are inclined to be lower, but spot lots of Continental materials are quoted about the same as a week ago.

Industrial Chemicals

ACETONE.—Inquiry maintained for early delivery. Some lots sold at £125 per ton, c.i.f. U.K.

ACID ACETIC.—Glacial 98/100%, offered at £59 to £62 per ton; 80% tech., £42 to £44 per ton; 80% pure, £43 to £45 per ton—all c.i.f. U.K. ports.

ACID BORACIC.—Unchanged; crystal or granulated, £55 per ton; powdered, £57 per ton, carriage paid U.K. stations.

ACID CARBOLIC (ICE CRYSTALS).—Now quoted 9½d. per lb.

ACID FORMIC, 80%.—Moderate inquiry. Price, £55 to £56 per ton.

ACID HYDROCHLORIC.—Makers' price unchanged, 6s. 6d. per carboy, ex works.

ACID NITRIC, 84°.—Unchanged at £27 10s. per ton, ex station, full loads.

ACID OXALIC.—In little demand, 6½d. to 6¾d. per lb., ex store.

ACID SULPHURIC.—Reduction of 5s. per ton; 144° now £3 15s. per ton; 168° £7 per ton, ex works; de-arsenicated quality, £1 per ton more.

ACID TARTARIC.—Price maintained at 1s. 2½d. per lb.

ALUM LUMP POTASH.—Offered from Continent at £10 per ton. c.i.f. U.K.; spot lots about £12 per ton, ex store.

ALUMINA SULPHATE.—14/15%, £7 10s. per ton; 17/18%, £9 10s. per ton, ex wharf, early delivery.

AMMONIA ANHYDROUS.—Price unchanged at 1s. 6d. per lb., ex station.

AMMONIA CARBONATE.—Lump, 4d. per lb.; ground, 4¼d. per lb. delivered.

AMMONIA LIQUID.—880°, 2¾d. per lb.; 920°, 1¾d. per lb., ex works.

AMMONIA MURIATE.—Grey galvanisers quality, £30 to £31 per ton, f.o.r.

AMMONIA SULPHATE.—25¼%, £15 5s. per ton; 25¾%, neutral, £16 8s. per ton, ex works. February.

ARSENIC, WHITE POWDERED.—Numerous export inquiries. Quoted about £74 per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—Continental material at £16 10s. per ton, ex wharf.

BARYTES.—Finest white English unchanged at £5 5s. per ton, ex works. Continental material £3 10s. to £4 15s., c.i.f. U.K.

BLEACHING POWDER.—£11 10s. per ton, ex station. Spot delievery; contracts £1 per ton less.

BORAX.—Unchanged; crystal or granulated £28 per ton; powdered £29 per ton, carriage paid U.K.

CALCIUM CHLORIDE.—English make £5 15s. per ton, ex quay or station. Continental £4 15s. per ton, ex store.

COPPERAS, GREEN.—Offered at £2 10s. per ton, f.o.b.

COPPER SULPHATE.—Moderate inquiry. Quoted £25 10s. per ton, ex station.

DEXTRINE.—Finest Dutch white or yellow, quoted £19 15s. per ton, c.i.f. U.K.

FORMALDEHYDE, 40%.—Price about £89 per ton, ex wharf, early shipment £90 for spot delivery.

GLAUBER SALTS.—Quoted £4 per ton, ex store.

LEAD.—Red, £41 per ton; white, £53 5s. per ton, carriage paid U.K. stations. Continental red lead about £36 per ton, ex store.

LEAD ACETATE.—Fine white crystals, £37 10s., ex wharf, early delivery; brown, £2 per ton less.

MAGNESITE.—Finest Grecian quoted £8 10s. per ton, ex station.

MAGNESIUM CHLORIDE.—Cheaper Continental prices. Now about £2 12s. 6d. per ton, c.i.f. U.K. Spot lots, £3 10s. per ton.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial, £6 per ton; B.P., £7 per ton, f.o.b. U.K. Continental offers of £3 10s. per ton, c.i.f. U.K. for commercial quality.

POTASSIUM BICHROMATE.—English makers' price unchanged, 6d. per lb. delivered.

POTASSIUM CARBONATE, 90/92%.—Continental prices higher. Spot lots about £27 10s. per ton, ex store.

POTASSIUM CAUSTIC, 88/92%.—Offered at £29 10s. per ton, ex store.

POTASSIUM CHLORATE, 98/100%.—Remains about 3d. per lb.

POTASSIUM PERMANGANATE.—B.P. crystals quoted 9d. per lb., ex store.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at 1s. 5½d. per lb., ex stations.

POTASSIUM SULPHATE, 90/95%.—Offered at £13 per ton, basis 90%, ex wharf.

SODIUM ACETATE.—Spot lots about £24 per ton, ex store; £23 per ton forward delivery.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station; m.w. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' price, 4½d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 5s. per ton, ex quay or station; alkali, 58%, £8 17s. 6d. per ton, ex quay or station.

SODIUM CAUSTIC.—76/77%, £21 10s. per ton; 70/72%, £20 per ton; 60/62%, broken, £21 5s per ton; 98/99%, powdered, £24 17s. 6d., ex station.

SODIUM CHLORATE.—White crystals quoted 2½d. per lb., ex store.

SODIUM HYPOSULPHITE.—Commercial quality, £10 per ton, ex station; pea crystals about £15 10s. per ton, ex store.

SODIUM NITRATE, 96/98%.—Refined quality, £13 2s. 6d. per ton, f.o.b. or f.o.r.

SODIUM PRUSSIATE (YELLOW).—Now offered at 9½d. per lb., ex store; little inquiry.

SODIUM SULPHATE (SALTCAKE, 95%).—Price for home consumption, £4 per ton, on contract. Higher prices for export.

SODIUM SULPHIDE, 60/62%.—About £15 per ton, ex store, spot delivery. Quoted £13 per ton, ex wharf, early delivery.

SULPHUR.—Government surplus stocks of Sicilian thirds still available at £3 10s. to £3 15s. per ton, ex depot; flowers £10 per ton; roll, £9 per ton; rock, £8 per ton; ground, £8 per ton; prices nominal.

TIN CRYSTALS.—Unchanged, 1s. 2d. per lb.

ZINC CHLORIDE, 98/100%.—About £23 per ton, ex wharf.

ZINC SULPHATE.—Technically pure crystals, £14 10s. per ton, ex station.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ANTHRANILIC ACID.—Home inquiries. Price quoted, 10s. per lb. on 100% basis.

BETA NAPHTHYLAMINE.—Home inquiry. Price quoted, 4s. per lb., delivered.

BETA OXY NAPHTHOIC ACID.—Home inquiries. Price 10s. per lb., delivered.

DINITROCHLORBENZOL.—Home inquiries. Price £95 per ton, delivered.

DINITRO NAPHTHALENE.—Home inquiry. Price quoted 1s. 5d. per lb., delivered.

META XYLIDINE.—Home inquiry. Price 7s. 6d. per lb., delivered.

PARACHLOR PHENOL.—Supplies are offered at 2s. 11d. per lb., delivered.

PARANITRANILINE.—Large inquiries for export. Price 2s. 7d. per lb., f.o.b.

PURE TOLUOL.—Obtainable at 2s. per gallon, delivered in buyers' tanks.

PARADICHLORBENZOL.—Several export inquiries. Price £50 per ton, f.o.b. U.K. port.

Company News

DAY AND MARTIN, LTD.—At the adjourned meeting on February 8, a resolution was passed further adjourning the meeting to February 27.

BRYANT AND MAY, LTD—Allotment letters and/or scrip certificates to bearer in respect of 15 per cent. debenture stock should now be lodged with the company, to be exchanged for definitive certificates.

BANCO NACIONAL ULTRAMARINO.—A second interim dividend for the year 1922 of 8 per cent. became payable yesterday (Friday). Coupon No. 23 of bearer shares will be payable at the London office of the bank at the current rate of exchange of the day, less tax, at 5s. in the £1.

MATHER AND PLATT, LTD.—The directors announce a final dividend of 7 per cent., making 10 per cent. for the year, plus a bonus of 5 per cent., all tax free; £200,000 is placed to reserve and £174,953 is carried forward. For 1921 the dividend was 10 per cent., tax free, and £287,661 was carried forward.

NOBEL INDUSTRIES, LTD.—On Monday the company invited applications for the purchase of £1,750,000 5½ per cent. first mortgage debenture stock at 99 per cent., payable 5 per cent., on application, 10 per cent. on acceptance, and 84 per cent. on May 3. The list had only been open for a short time in the morning before it was announced that the issue had been heavily over-subscribed.

JOHN KNIGHT, LTD.—A profit of £151,315 for the year to November 30 last is shown in the accounts, and £62,702 was brought in, making £214,017. The directors recommend a further dividend on the cumulative ordinary shares, making 25 per cent. for the year and a dividend of 30 per cent. on the ordinary shares. The annual meeting will be held at the Great Eastern Hotel, Liverpool Street, London, on February 16, at noon.

YORKSHIRE INDIGO, SCARLET AND COLOUR DYERS.—The report for 1922 states that after providing for depreciation and all other charges, the trading for the year resulted in a profit of £13,759 which, with £2,752 brought in, makes £16,511. After paying debenture interest, the directors recommend the payment of a dividend on the preference and ordinary shares at 7½ per cent. for the year, less tax at 5s. 3d. in the £1, leaving £3,203 to be carried forward. The annual meeting will be held at Atlas Chambers, King Street, Leeds, on February 23 at noon.

Chemical Merchants' Trading Losses

AT the London Bankruptcy Court, on February 9, James Mill and David Lyell Mill (trading as Davidson and Lyell), agents and merchants, 35, Finsbury Square, London, attended for their public examination on a joint statement of affairs showing liabilities £15,116, of which £14,422 were returned as expected to rank, and assets £67 absorbed by the payment of preferential claims. It appeared that the debtors who had been engaged in the chemical and oil trades, began trading under the style of Davidson and Lyell in January, 1915, and the business was a success until September, 1920, when the trade slump set in, and their customers refused to accept delivery of goods ordered. They attributed their insolvency to their liability for goods ordered by them but not taken up, to the slump in trade, and to bad debts. According to their deficiency account, their liability in respect of difference on goods ordered but not taken up was £13,705. The examination was concluded.

Death of a Noted Agricultural Chemist

WE regret to record the death on February 8 of Mr. Frederick James Lloyd, F.I.C., a well-known agricultural chemist. Born near Swansea in 1852 he came to London in 1870, and met the late Dr. Voelcker, with whom he worked as laboratory assistant until 1874. From Dr. Voelcker he obtained introductions to a number of the leading German chemists of the day. After spending some time in Germany he became an abstractor for the *Journal* of the Chemical Society. When the Royal Agricultural Society opened a laboratory of its own Lloyd was appointed chief laboratory assistant, where he remained for four years, at the end of which period he opened a laboratory of his own in Lombard Court. On the death of Dr. Voelcker, Mr. Lloyd was appointed consulting chemist to the British Dairy Farmers' Association.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. No.
Roumania...	Chemicals, oils, waxes, etc...	—
Spain	Fertilisers, agricultural chemicals, etc.	207
Australia....	Ammonium chloride.....	10542 E.D.I C.C.
Canada	Drugs.....	204

"Chemical Age" Inquiry List

The following inquiries have been received from readers of "The Chemical Age." Replies addressed to the box number given below, c/o "The Chemical Age," 8, Bouverie Street, London, E.C.4, will be forwarded to the inquirers.

Manufacturers of iron spun crucibles; gun metal crucible tongs; steel-bladed spatulas; watch and clock glasses; glass funnels, test tubes, etc.—No. H.12.

Manufacturers of plant for sulphur recovery from pyrites.—No. H.13.

A Soap Contract Arbitration

IN the Scottish Courts on February 6, Lord Morison gave judgment in cross actions between, on the one hand, the Belgimex Compagnie Belge d'Importation et d'Exportation, Brussels, now in liquidation, and others, the liquidators of the company, and Walter Potts and Co., Ltd., 329, High Holborn, London, their mandatories, and, on the other hand, John Poynter, Son, and Macdonalds, manufacturing chemists, 86, Virginia Street, Glasgow. The Belgian company claimed payment of sums of £400 and £6,416, for goods not supplied, and as damages for breach of contract. The claim by John Poynter, Son, and Macdonalds was for £993 in respect of breach of contract in connection with the purchase by the Belgian company of 30,000 cases of soap, to be delivered at Antwerp in instalments of 3,000 cases each between November, 1919, and March, 1920. Owing to the rapid decline of the German mark, the Belgian company was unable to take the second instalment at the due date, and ultimately the manufacturers declined to continue supplies. The commission to which Messrs. Poynter were entitled on the whole contract was £1,393, towards which they had received only £400, and they sued for the balance, but maintained that the dispute between the parties fell to be settled by arbitration. Lord Morison conjoined the actions and sisted process to await the result of an arbitration.

Irish Regulation of Dye Imports

THE Irish Free State has announced, the *Morning Post* states, its intention of departing from the British system of restricting imports and levying duty on dyes. It appears that German dyestuffs may be imported into the Free State without a United Kingdom licence or duty, with the sole condition that the importer in the Free State gives an undertaking that the dyes will be used in the manufacture of Free State goods. If the Free State is able to give effect to this, and is able to import German dyes direct from Hamburg to Dublin, the effect on Northern Ireland will be inconvenient in two respects. The textile manufacturers of the North will be working under an extra burden as compared with the South in regard to their expenditure on dyes; and the guarding of the frontier against smuggling from the South into the North of German products will be a heavy task.

THE BRITISH ALIZARINE COMPANY LTD.

Manchester London Glasgow

Manufacturers of Alizarine Dyestuffs

ALIZARINE RED (all shades)

ALIZARINE BLUES (soluble and insoluble)

ALIZARINE BORDEAUX

ALIZARINE CYANINE

ALIZARINE GREEN (soluble and insoluble)

ALIZARINE ORANGE

ALIZARINE RED S. POWDER

ALIZARINE BLUE BLACK

ALIZARINE (MADDER) LAKES (of all qualities)

ALIZARINE MAROON

ALIZUROL GREEN (Viridine)

ANTHRACENE BROWN

ALIZANTHRENE BLUE

ALIZANTHRENE BROWN

ALIZANTHRENE YELLOW

Other fast colours of this series in course of preparation

Anthraquinone, Silver Salt and all intermediates of this series

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CHROME TANNING and other Chrome Compounds

TELEPHONES
663 Trafford Park, MANCHESTER
660 EAST LONDON
2067 DOUGLAS, GLASGOW

TELEGRAMS:
BRITALIZ MANCHESTER
BRITALIZ LONDON
BRITALIZ GLASGOW

All communications should be addressed to
The British Alizarine Co., Ltd.
Trafford Park, Manchester

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

CHEMICALS AND BY-PRODUCTS, LTD., R/O, Rickmansworth Road, Watford, chemical manufacturers. (C.C., 17/2/23.) £25 19s. 6d. December 18.

TURNER DRUG AND GALEMEAL, LTD., Roden Street, Ilford, druggists' sundriesmen and chemical manufacturers. (C.C., 17/2/23.) £56 0s. 5d. December 22.

WOODBROOK DRUG CO., 65, Church Lane, Wolverhampton, druggists. (C.C., 17/2/23.) £13 16s. 10d. December 29.

Receiverships

NEW BRITANNIC CHEMICAL CO., LTD., Cardiff. (R., 17/2/23.) R. Leyshon, of 108, Bute Street, Cardiff, was appointed receiver and manager on February 5, 1923, under powers contained in debenture dated July 19, 1922.

WESTERN GLASS BOTTLE CO., LTD., Newport, Mon. (R., 17/2/23.) C. Matcham, of St. John's Chambers, Christmas Street, Bristol, was appointed receiver and manager on February 3, 1923, under powers contained in debenture dated August 18, 1921, and January 10, 1922.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

HARKER (C. R.), STAGG AND MORGAN, LTD., London, E., manufacturing chemists. (M., 17/2/23).—Registered January 31. Land Registry charge, to Bank; charged on Devon Wharf and 3, Emmott Street, Mile End. *£60,000. January 24, 1923.

STUCKEY (W. G.) AND CO., LTD., London, W., chemists. (M., 17/2/23.)—Registered February 3, debenture securing £600 and further advances, to C. Hulbert, 230, Brecknock Road, Tufnell Park, N.; general charge.

London Gazette

Companies Winding Up Voluntarily

J. D. BISHOP AND CO., LTD. (C.W.U.V., 17/2/23.) F. J. Braybrooks, Chartered Accountant, 35/3, Broad Street House, London, E.C.2, appointed liquidator. Meeting of creditors at Winchester House, Old Broad Street, E.C., on February 23, at 12 noon.

CAPSOL DYES, LTD. (C.W.U.V., 17/2/23.) Lewis Aspinall, F.S.A.A., Incorporated Accountant, 47, Talbot Road, Blackpool, appointed liquidator. Meeting of creditors at 47, Talbot Road, Blackpool, on Wednesday, February 21, at 12 noon.

Notices of Dividends

DODD, Richard Jefferson, 70, Tottenham Court Road, in the county of London, and 146, Edgware Road, W., 35, Hampstead Road, N.W., 123, Judd Street, W.C., 121, Euston Road, W.C., 310, Gray's Inn Road, W.C., chemist and druggist. Amount per £, 3d. Supplemental. Payable, any day (except Saturday) between the hours of 11 a.m. and 2 p.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

VAUTIN, Claude, lately carrying on business at 66, Old Broad Street, London, metallurgist. Amount per £, 2½d. Supplemental. Payable, any day (except Saturday), between the hours of 11 a.m. and 2 p.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Companies Winding Up

ANGLO-CUBAN OIL, BITUMEN AND ASPHALT CO., LTD., 513, Salisbury House, London. (C.W.U., 17/2/23.) Last day for receiving proofs for dividend, February 28. Liquidator, H. E. Burgess, Senior Official Receiver and Liquidator, 33, Carey Street, Lincoln's Inn, London, W.C.2.

MAASTRICHT ZINC WHITE CO., LTD., India House, 84, Leadenhall Street, London. (C.W.U., 17/2/23.) Meeting of creditors, Feb 23, 11.30 a.m.; and of contributories, February 23, 11.45 a.m., 33, Carey Street, Lincoln's Inn, London, W.C.2.

New Companies Registered

J. AND W. BROWN, LTD., 271A, Tooley Street, S.E.1. Soap manufacturers, oil refiners, etc. Nominal capital, £10,000 in £1 shares.

CHEMICAL MILLING CO., LTD., 5, Wine Office Court, Fleet Street, London, E.C. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £2,500 in 2,000 preference shares of £1 each and 10,000 ordinary shares of 1s. each.

F. C. DEVON AND CO., LTD., 17, Philpot Lane, London, E.C. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £10,000 in £1 shares.

R. W. HARRISON AND CO., LTD. Soap and varnish manufacturers. Nominal capital, £2,000 in £1 shares. Solicitors: H. Schofield, 1, Richmond Terrace, Blackburn.

HASLAR'S PATENT APPLIANCES, LTD. Manufacturing chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £1,500 in 200 7 per cent. cumulative preference and 1,000 ordinary shares of £1 each, and 3 founder's shares of £100 each. A director: C. W. Fenn, 29A, High Road, Kilburn, London, N.W.6.

LANCELOT FOSTER AND SONS, LTD., 88-90, Walmgate, York. Manufacturers of and dealers in all kinds of manures, guano, nitrate of soda and fertilising substances. Nominal capital, £15,000 in £1 shares.

A. C. OLDS AND CO., LTD., 1 Argyle Street, Bath. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £5,000 in £1 shares (4,000 7 per cent. cumulative preference).

The Dispersoid Syndicate

PARTICULARS of the Dispersoid Syndicate, Ltd., have been filed pursuant to Section 274 of the Companies (Consolidation) Act. The company, which has a capital of £750,000 in £1 shares, was incorporated in Guernsey on October 22, 1922, to acquire from Herman Plauson the benefit of certain inventions (not described). The British address is at Seymour House, 17, Waterloo Place, Pall Mall, London, where J. Finer is authorised to accept service of process and notices on behalf of the company. The directors are:—H. Plauson, 14, Huxter, Hamburg, Germany (chemical engineer, director, Plausons (Parent Co.) Ltd.), J. A. Vielle, of 17, Alleyn Park, West Dulwich, S.E.21 (director of above-mentioned and other companies), E. A. Kite, 31, Warwick Gardens, W.14, and Sir Amos Nelson, Valley Mills, Nelson, Lancs. (director of Dart Mill Co., Ltd., and other companies).

An Interesting Debate

CONSIDERABLE interest attaches to the debate on Communism which is to take place under the chairmanship of Lord Askwith, at the Kingsway Hall, on February 22. Sir Ernest Benn, Bart., the chairman of Benn Brothers, Ltd., is to move: "That Communism would be a Danger to the Good of the People." Mr. J. T. Walton Newbold, Communist M.P. for Motherwell, who is now on his way back from Moscow, will oppose. The debate is arranged on sporting lines in three rounds. Mr. Newbold, having refreshed himself with the very latest developments of the Communist faith at its headquarters in Moscow, will probably be able to give a new interest to the meeting. Admission will be by tickets, half of which are to be distributed by the Communist Party, and half by the Industrial League, 82, Victoria Street, London.